WESTERN GAS

January 1927

20 Cents the Copy

Won't Leak **Won't Stick**

Write for Catalog

Merco Nordstrom Plug Valves

Stop Leaks

on all gas, steam or fluid lines

MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY

Engineers— MERCO *Manufacturers*

San Francisco 121 Second Street | New York 110 W. 40th Street | Chicago Peoples Gas Building | Houston 613 Washington Avenue | Cleveland 325 Engineers Building | *Agencies in Principal Cities*

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A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

TP700
.T3

SOUTHWESTERN
FACTORY BUILT

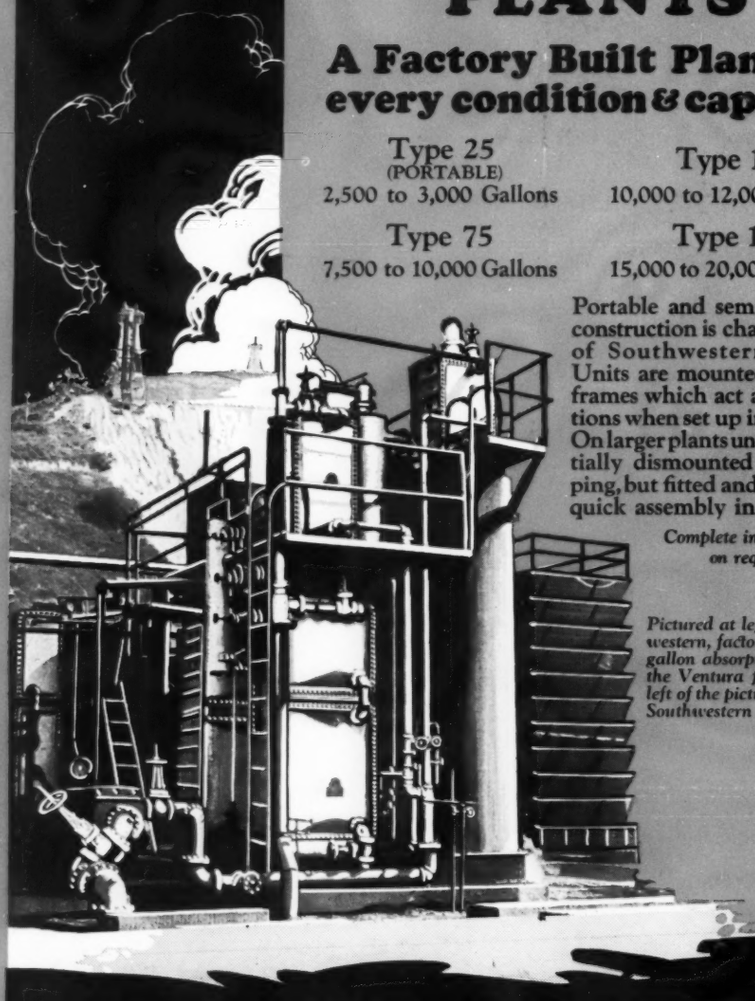
ABSORPTION PLANTS

A Factory Built Plant for every condition & capacity

Type 25 (PORTABLE) 2,500 to 3,000 Gallons	Type 100 10,000 to 12,000 Gallons
Type 75 7,500 to 10,000 Gallons	Type 180 15,000 to 20,000 Gallons

Portable and semi-portable construction is characteristic of Southwestern plants. Units are mounted on steel frames which act as foundations when set up in the field. On larger plants units are partially dismounted for shipping, but fitted and piped for quick assembly in the field.

Complete information on request



Pictured at left is a Southwestern, factory built, 7500 gallon absorption plant in the Ventura field. At the left of the picture is a small Southwestern portable.

SOUTHWESTERN ENGINEERING CORP.
LOS ANGELES U.S.A.

SOUTHWESTERN ENGINEERING CORP.

1221 HOLLINGSWORTH BLDG.

Los Angeles, Calif.

Offices
TULSA
AMARILLO, TEXAS
NEW YORK

Factories
CULVER CITY, CAL.
TULSA

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BCB Mar. 7, 1927

944
350Z

TEEPLE announces the completion of a new plant and installation of new equipment to meet the increasing demand for automatic temperature controls. Six years of constant research and striving to build better, more efficient control equipment has brought about a sound, constant growth. Engineers who have spent years gaining valuable experience in this field are at your service to assist you with your temperature control problems.

The L. R. Teeple Company manufactures complete equipment for the automatic control of gas, steam, hot water, air, oil, or electric heating systems, or for refrigeration control. ¶Industrial plants of all kinds, and homes all over the country are using Teeple Controls and Teeple service. You are invited to write in for details.

L. R. Teeple Company 540 East Ninth Street Portland, Oregon

TEEPLE

TEMPERATURE

TEEPLE *Controls*

Pacific Coast Distributors for Honeywell Heating Specialties Co.

WESTERN GAS

626 S. Spring Street,
Phone TUcker 8982
Los Angeles, Calif.

447 Sutter Street
Phone GArfield 5383
San Francisco, Calif.

Official Publication Of The
Pacific Coast Gas Association

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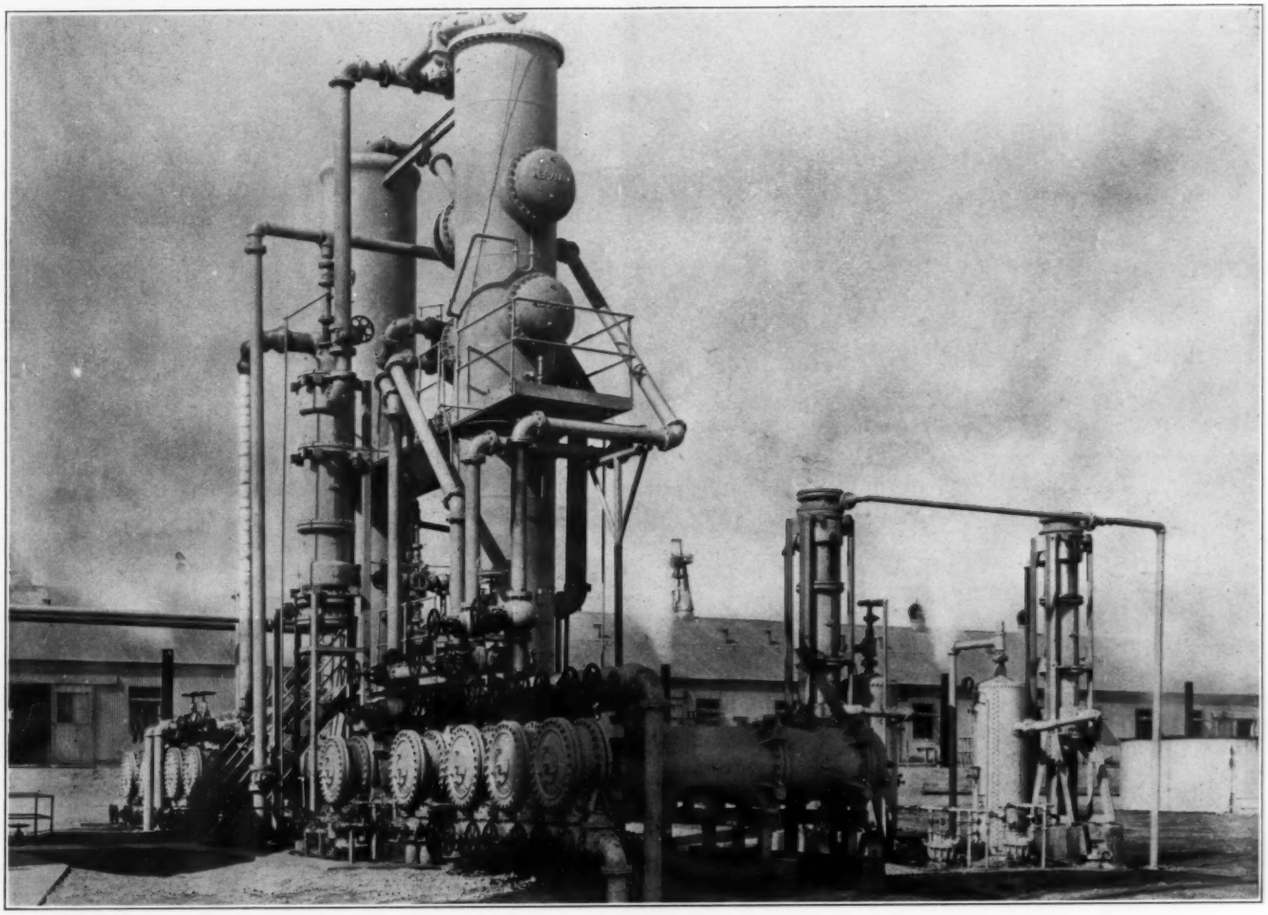
BRAUN



Above is pictured a Braun Distillation Unit recently installed in an absorption plant of one of the large oil companies. Bulletin 117-A, which gives complete information on Braun absorption plant apparatus, will be sent upon request.

C. F. BRAUN & CO.

Manufacturing Mechanical Engineers
Tulsa Alhambra, Calif. Dallas

Lampblack

from

Oil-Gas

can be made

Profitable

by using

Oliver-Borden Thickners

and

Oliver Filters

We will gladly tell how

Oliver Continuous Filter Co.

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JOHANNESBURG, SOUTH AFRICA
E. L. Bateman, The Corner House

SESQUI-CENTENNIAL INTERNATIONAL EXPOSITION PHILADELPHIA 1926

Medal of Honor

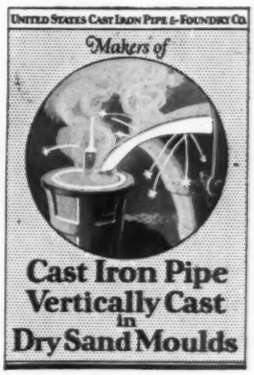
for

deLavaud Centrifugal Cast Iron Pipe

THE international jury of awards of the Sesqui-centennial accorded the highest award to deLavaud centrifugal pipe.

This official recognition of the advance that the deLavaud process has brought into the pipe industry will be significant to all engineers and construction experts.

Write for special literature covering the specifications, manufacture and use of deLavaud Centrifugal Cast Iron Pipe.



United States Cast Iron Pipe and Foundry Company

SALES OFFICES

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 975 East Ferry Street
Cleveland: 1150 East 26th Street
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San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th St. & Hennepin Ave.

General Offices:
Burlington, New Jersey

Our Nineteen Twenty-Seven Wish to You

AT THIS TIME, standing on the threshold of another year, we pause to reflect on our efforts of the past twelve-month period.

With earnest appreciation of the good will and business which have come to us during 1926, we offer sincere greetings to our friends and patrons of this far-western territory—extending from Vancouver on the north to San Diego on the south—and wish them

Health, Wealth and Happiness

during the coming year.

Pacfic Meter Works

of the
American Meter Company, Inc.
Northwestern Representative

SAN FRANCISCO
495 Eleventh St.

PORTLAND
Northwestern Gas and Electric Equipment Co.

LOS ANGELES
2118 Atlantic St.

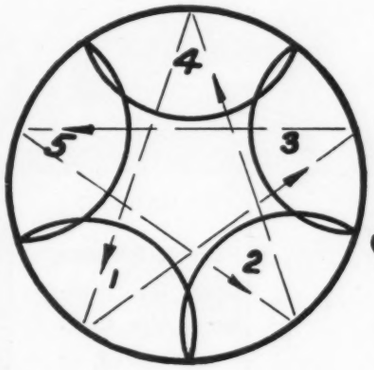
Steere Charging Machine

for automatically and continuously fueling Water Gas and Blue Gas generators with either coke or bituminous coal.

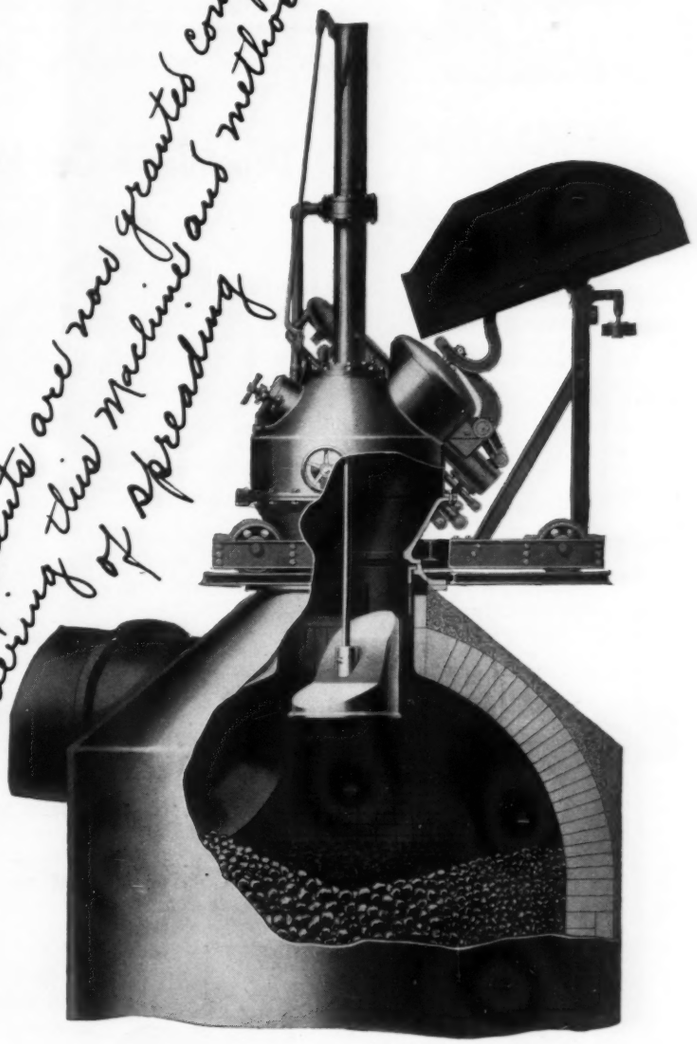
The directing chute puts the fuel exactly where it should go.

The automatic chute turning device does not put two charges adjacent.

Note by the diagram how the charges are automatically placed 1-3-5-2-4.



Our patents are now granted completely covering this machine and method of spreading



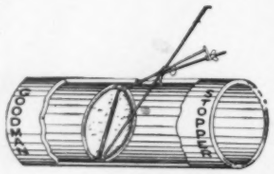
Patents ~~applied for~~ granted

This is the charging machine that is giving real service and satisfaction. Every feature is a 100% product of the organization of the Steere Engineering Company. The only way to fully appreciate the advantage of automatic charging is to actually watch this machine in operation.

We Know We Can Save You Money

STEERE
ENGINEERING CO.
DETROIT, MICHIGAN

GOODMAN *IMPROVED* SAFETY GAS MAIN STOPPER



The genuine Goodman Stopper is instantly recognized by the name Goodman which appears on the Improved Patented Locking Sleeve. All genuine Goodman Stoppers are now equipped with this sleeve. Efficient as the Goodman Stopper has always been, the new locking sleeve makes the shut-off still more effective and positive. Stopper cannot slip—gas cannot pass.

All sizes 3 inches to 48 inches in stock. Special sizes on short notice.

SAFETY SERVICE PLUGS

Type "A"

Expansion Plug which fits into the bottom of the service tee and is quickly expanded by turning the wing nut which securely shuts off all gas. Sizes ¾" to 4"..

Type "B"

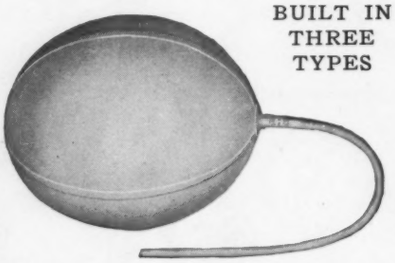
One piece Rubber Plug, taper shaped. Can be quickly applied to service tee. Fits wedge like and prevents gas escaping. Sizes ¾" to 4".

AIR LINE MASK

With or Without Blower

Dependable Gas Main Bags

BUILT IN THREE TYPES



Type A—Invisible Seams or Seamless Bag.

Type B—Reinforced Seams—heavier and stronger than Type A.

Type C—Canvas Covered Bags for use in mains coated with tar or oil.

When ordering specify type desired.

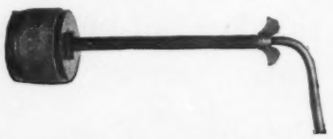
All Goods Sent on Approval

SOAP TAPE

A convenience to have on hand when searching for leaks in mains or services.

Strips 2", 4", 6" and 8" wide each, 40 ft. in length. Put up in sealed containers. Sample sent on request.

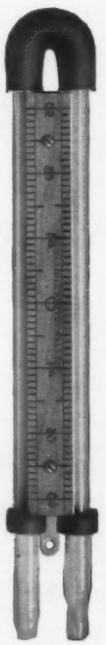
EXPANSION PLUGS FOR GAS MAINS



Fits inside diameter of pipe. Long shank reaches inside past the hub. Can be used in either hub or spigot ends. Standard sizes to 16".

"U" GAUGES

Portable Pressure Gauge for Distribution Men, Complaint Men, or around the Works.



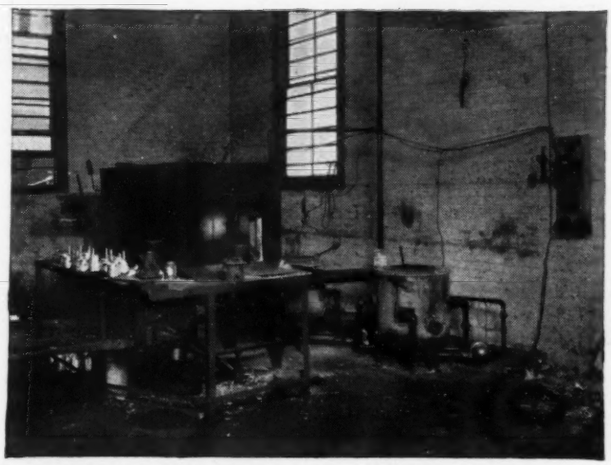
SAFETY GAS MAIN STOPPER CO.

Pacific Coast Representative: C. B. BABCOCK CO., San Francisco

Cable Address: GASTOPPER, N. Y.

523 Atlantic Ave. **Brooklyn, N. Y.**

HOW *Lewis R. Davis* equipped his plant to make pistons



Gas-fired moulding unit at Acme Manufacturing Works, Inc., 660 Turk Street, San Francisco. Here metal-alloy "Reflex" pistons are cast. The metal is heated to 1000° in the two gas-fired furnaces on the right. It is then poured into pre-heated moulds shown on the working table.

"WHEN developing our metal-alloy "REFLEX" pistons, we equipped our plant with pre-heating furnaces, each unit consisting of an oven with heating space of approximately five feet by nine feet, and two melting pots of two-hundred pounds capacity each subjoined thereto. These ovens and pots are heated by gas and we report very successful results.

"The gas furnished can be always relied upon with regard to even temperature."

Increasing demand for product

The pistons made in Mr. Davis' plant, the Acme Manufacturing Works Inc., are a new metal-alloy piston. There is an increasing demand for them by two of America's foremost automobile and truck manufacturers.

P G and E engineers will serve you

If you have any industrial heating problems, the P G and E engineers will gladly assist you in solving them. They have information available on industrial heating operations which have been conducted successfully for many years. This service is at your command without cost or obligation on your part.

Phone or write the nearest P G and E office. Ask for this service.

LEWIS R. DAVIS

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned · Operated · Managed by Californians

IF IT'S DONE WITH HEAT YOU CAN DO IT BETTER WITH GAS

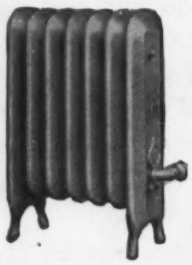
POTTER Heating

For many years POTTER Engineers have pioneered the way in the advancement of modern Gas Heating Systems. They have developed Gas Heating to such a degree of perfection that today, POTTER Products have become a standard of comparison wherever dependable, safe, economical and healthful gas heating is discussed.

OUR BEST ASSET

The tens of thousands of satisfied customers that our Organization has made through POTTER Gas Heating installations, is a JUST tribute to a satisfactory product—a gratification to conscientious effort.

THERE ARE MANY REASONS WHY IT IS BETTER TO INSTALL POTTER SYSTEMS

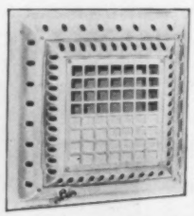


"POTTER" Vented Radiators

Only POTTER has these 7 POTTER Features

(Cast Iron and Steel-Made)

1. Condensation abolished. This does away with corrosion. Many years are added to the life of the Radiator.
2. Triple Circulation. The heat goes into the room, not up the flue.
3. Uniform warmth distribution. The air is never "cooked."
4. Quick heat. No other radiator heats so quickly as the light, efficient POTTER Steel-Made.
5. Aristocratic appearance. The POTTER Cast Iron Radiator is selected for the finest and largest homes.
6. Totally odorless always.
7. Not expensive.



"COLE" Floor and Wall Heaters

Made in heavy solid cast aluminum.

COLE is the only furnace manufactured that can be installed on either the first or second floor.

"MAGIC WAY" FURNACES

"MAGIC WAY" was the first, and has always been considered the leading Unit System of heating.

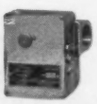
The principle of Unit Heating of modern buildings, brought to its present state of refinement through the study and efforts of this Organization, is based on the principle of an individual furnace or heater for each room or group of rooms to be heated.

This type of installation allows accurate temperature control in each room, regardless of the demand in other sections of the home.

POTTER quantity production now makes "MAGIC WAY" with electric controls, available to anyone who desires a gas furnace system.

The same features that make these well known POTTER-made appliances favorites with home builders and home owners, make them popular with churches, schools, theatres, auditoriums and factories.

The low cost of adequate heating by means of "MAGIC WAY" Vented Furnaces of either the Unit or Central Plant type, will be a revelation.



"MAGIC WAY" VALVES

By merely pressing a button, the temperature of any room may be regulated. This valve not only turns the heat on but it regulates the heat to suit your exact wants.

"MAGIC WAY" Floor Furnace

When the furnace type of heat is desired at low cost or when a basement is not available, use "Magic Way" Vented Floor Furnaces.

Potter Heating Includes:

"MAGIC WAY" UNIT FURNACES
"POTTER" GAS RADIATORS
"STEEL-MADE" GAS RADIATORS
"COLE" FLOOR AND WALL FURNACES

There Is a **POTTER System** for Every Need

POTTER RADIATOR CORPORATION

San Francisco—Oakland—Los Angeles—San Diego

Would you like to represent.....

The West's largest Gas Heating Organization

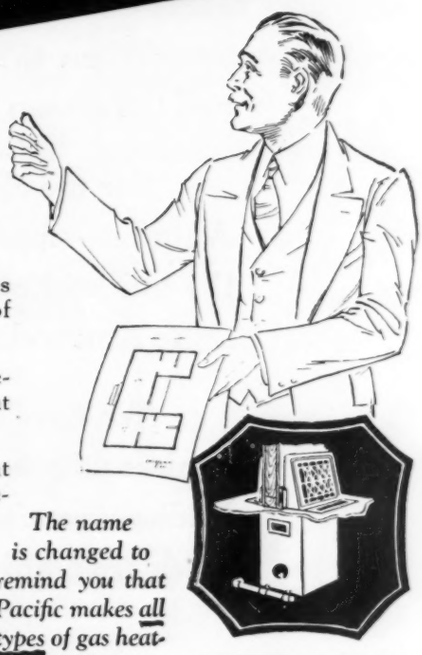
—and get in on every heating job in your territory!

Every Pacific Agency has **more** opportunities to make **more** sales than competitors—because Pacific manufactures a complete line of appliances which fit every heating job.

Your agency becomes known as "Gas Heating Headquarters" because builders look to you to tell them which one of the 8 different types of appliances solves their particular heating problem.

And whichever type is selected—you can quickly demonstrate that Pacific manufactures that particular appliance of higher quality materials. Every Pacific appliance is the recognized quality standard of its type.

There's more profit for you in Pacific—and a mighty attractive agency proposition waiting for you if you'll write.



The name is changed to remind you that Pacific makes all types of gas heating appliances.

Pacific Dual Pipeless Furnaces

—an exclusive Pacific invention that heats two rooms at once. No basement needed. Just one of the many appliances made by Pacific.

Pacific Gas ~~Radiator~~ Heating Company

Gas Heating **Headquarters**

Largest in the West. Representatives in Principal Western Cities.
General Offices & Exhibit at 1732-40 West Washington St., Los Angeles
Telephone BEacon 2190

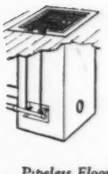
Gas-Steam Radiators

Dual Pipeless Furnaces

Wall and Fireplace Heaters

All Vented for Healthful Heat

Gas Radiators—Pressed Metal and Cast Iron



Pipeless Floor Furnaces

Unit Basement Furnace Systems

Manufacturers of Every Type of Gas Heating Appliance

There Is No Division Line in Radiantfire Sales

When the leaves begin to fall, it's Autumn, and Humphrey Radiantfire sales mount high.

When the buds begin to form again, it's Spring—and the season for Humphrey Radiantfire sales continues.

For the climate of Spring is much like the climate of Autumn—sparkling air and a crisp temperature in which the quick-firing warmth of the Humphrey Radiantfire is more than welcome.

We have seen it demonstrated again and again, that dealers who keep up their sales efforts on the Humphrey Radiantfire after the calendar has passed the January 1st mark are amply rewarded by the results.

The HUMPHREY
Radiantfire
REGISTERED TRADE MARK

Manufactured by
General Gas Light Company
Kalamazoo, Mich.

Pacific Coast Manager
C. B. Babcock
135 Bluxome Street, San Francisco

ROPER SWINGS THE KNIFE RIGHT TO THE BOTTOM OF PRICES

NO COMPROMISE WITH QUALITY

BETTER THAN EVER—MAKE US PROVE IT!

ROPER

TRADE MARK REG. U.S. PAT. OFF. REG. IN CANADA

GAS RANGES

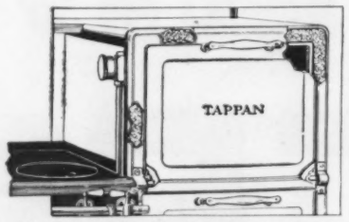
GAS FURNACES

GEO. D. ROPER CORPORATION, *Rockford, Ill.*

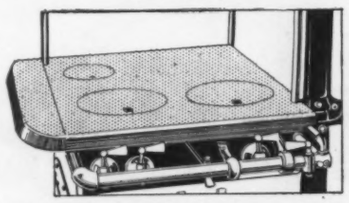
PACIFIC COAST BRANCH: 135 BLUXOME STREET, SAN FRANCISCO, CALIFORNIA

The Insulated Oven is Unique in The TAPPAN

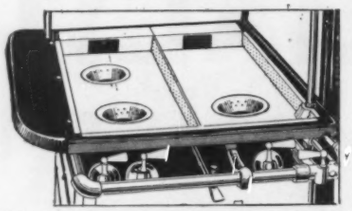
Competition is keen these days in selling gas ranges. . . . The ranges you sell can probably be very nearly duplicated by other dealers right in your community—unless you sell the **TAPPAN Insulated Oven Gas Range.**



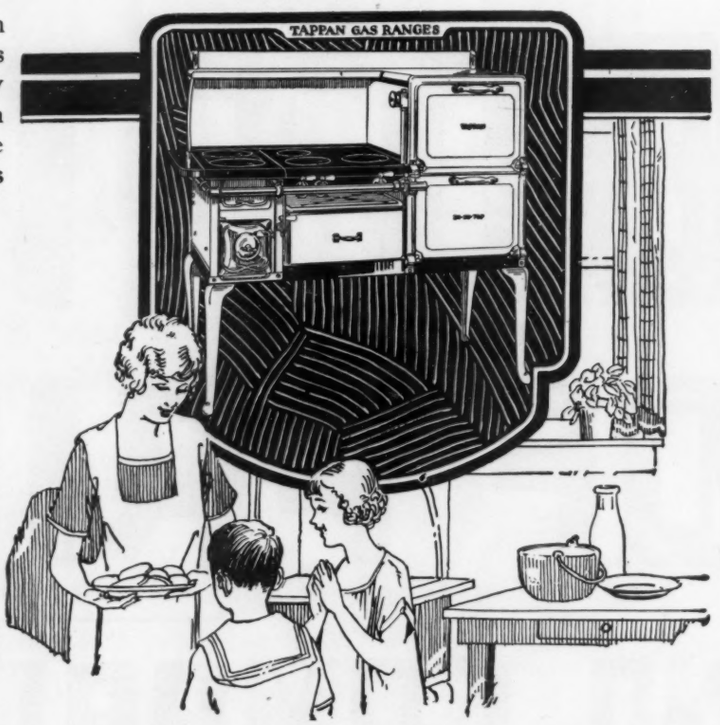
The TAPPAN oven is insulated with 25 lbs. of mineral wool, yet it is completely ventilated. The heat is kept in the oven; your kitchen is always comfortable, and half the gas is saved.



The TAPPAN solid top is made of oil-tempered, satin-finished cast iron. It will not stain or discolor, and is easy to keep clean.



The bowl burners under the TAPPAN solid top are scientifically designed for most efficient, labor-saving cooking. The combustion chamber greatly increases the heat-efficiency of the fuel. It saves gas.



Years ahead of others, the TAPPAN has its unique **insulated oven.** This is a feature which is not found in any other gas range sold on the Coast, to our knowledge. Every woman who has used the **TAPPAN** Insulated Oven considers it a priceless feature, saving half the fuel, increasing cooking efficiency, keeping kitchens comfortable.

And the TAPPAN offers every other feature found on other ranges, besides its insulated oven. . . . You can minimize competition by selling the **TAPPAN Insulated Oven Gas Range.**

TAPPAN INSULATED OVEN GAS RANGE

TAPPAN STOVE COMPANY

Pacific Coast Office
665 Howard Street—San Francisco

H. R. BASFORD COMPANY
Direct Factory Representatives
Northern California—Nevada—Hawaii
665 Howard St.—San Francisco

H. R. MAYER
Direct Factory Representative
Southern California—Arizona
1001 East First St.—Los Angeles

Amazingly Lower Prices!

HOTZONE

WATER HEATERS

are greatly reduced in price. Material and workmanship remain the same—the best. Thousands of satisfied gas company consumers prove the soundness of HOTZONE method for heating water by gas. Write for data.

Welsbach Company, Gloucester, N. J.

Branches in Principal Cities

San Francisco Office: 863-865 Mission Street

Member American Gas Association
Member Natural Gas Association

Welsbach

To Meet Your Requirements

During more than ten years of broad experience in all matters pertaining to hauling problems, TRUCK TIRE SERVICE has constantly been meeting the needs of the local gas industry....supplying the particular type Goodyear Tires....Solids and Pneumatics....and the particular kind of Service that makes for maximum transportation efficiency at minimum cost per tire mile.

"A Tire for Every Need"

Truck Tire Service Co.

HOLLYWOOD
6523-Santa Monica Blvd.
Telephone HO-5524

LONG BEACH
220-East Anaheim
Telephone - 62279

1244-East 8th Street — MEtropolitan 6391
LOS ANGELES CALIFORNIA

WESTERN GAS

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in the *Eleven Western States*

The Relation *of* Science *to* Gas

By R. M. CONNER
Director, Testing Laboratory
American Gas Association

ONE of the outstanding factors in bringing about a successful recovery of German industry following the World War was the general application of science to the solution of Germany's industrial problems. The German people have long been noted for their accomplishments in this field, and this fact among other things, has resulted in some remarkable developments during the past few years in the art of manufacturing and utilizing city gas.

The last century has witnessed greater improvement in our different manufacturing processes and methods of transportation than during all other preceding periods in the history of mankind. The steamship, railroad, automobile, airplane, electricity and gas have all been great factors in placing our standards of living on a much higher plane.

It is interesting to note that the more important inventions revolutionizing customs of former years have had their inception in the scientist's brain and that they have depended for their development and perfection on men of a mechanical turn of mind. In the beginning let me state that this is not an attempt to minimize the efforts of the commercial man but an effort to set forth the value and absolute necessity of science in our business. The commercial man after all has been the force necessary to turn all new inventions to a commercial advantage and place them at the disposal of his fellowmen. History confirms this statement in almost every instance, the only two outstanding exceptions being Henry Ford and Thos. A. Edison.

APPLIANCE ENGINEERS NEEDED

During the last hundred years there has been considerable progress made in the manufacture of gas appliances and in the art of utilizing gas. I do not feel, however, that in this phase our business has kept step with its other activities of a technical nature. In fact this phase of the gas business, on account of what appeared to be more important matters at the time, was neglected. This condition can be attributed largely to a former lack of interest on the part of a sufficient number of engineers and scientific men in the gas appliance business. Even today we have entirely too little knowledge of the fundamental principles governing gas appliance construction and design. Further than this, there are comparatively few engineers who may be classed as experts on this subject, which points to the fact that more young technical graduates should be encouraged to study the scientific aspects of the appliance business. The Consolidated Gas Company of New York met this situation recently by selecting six young college graduates from different institutions to specialize in gas appliances and strictly utilization work. These engineers will begin their services in their testing laboratory. For a number of years they have recognized the importance of this branch of their business, but their recent action indicates that they now regard it as one of the most essential ones in assuring the best of service to their customers. A number of other companies are also following this policy and some of them now have fairly efficient utilization departments manned by staffs of competent engineers. The number of them however, is still entirely too low. Some appropriate action should be taken generally to recognize the importance of this branch of the gas business if our industry is to progress in the future as it should.

Gas appliance manufacturers also lack sufficient technical supervision in their manufacturing processes. The writer feels that several thousand young engineers who thoroughly understand combustion could very profitably be employed in the gas appliance manufacturing business. Our Testing Laboratory can and is assisting the gas appliance manufacturers to a great extent but the information furnished by it can never be completely and successfully applied without the advice and efforts of the engineer.

UNIVERSITIES CAN HELP

During recent years colleges and universities throughout the country have turned out thousands of graduates in electrical engineering and these young men have found their way into all branches of the electrical business. It is common knowledge that their work, particularly in such establishments as the General Electric and Westinghouse Companies, has resulted in some wonderful advancements in the art of utilizing electricity. Until recently there were no colleges that recognized the necessity of installing a course in gas engineering. John-Hopkins University in Baltimore, Md. was the leader in this movement and now several institutions offer very complete courses in the study of gas. It is the writer's prediction that many other universities throughout the United States will follow John-Hopkins' example within the next few years.

The gas industry owes much of the progress that has been made in the utilization of gas to several of our governmental bureaus. Messrs. E. R. Weaver of the U. S. Bureau of Standards and A. C. Fieldner of the U. S. Bureau of Mines through the research of their respective departments, have established

many of our basic facts. They have also given valuable assistance to the appliance manufacturers by conducting tests and publishing numerous bulletins that have been of tremendous value not only to them but to the entire gas industry. The U. S. Health Department through the efforts of their Chief Surgeon, Dr. R. R. Sayers, has also contributed a great deal of valuable and original data on the physiological effects of CO.

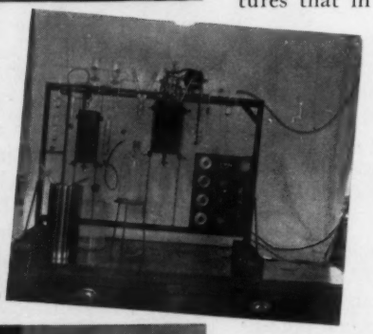
Engineers entering the gas business should be encouraged to take up utilization work. Where there is such a decided shortage of competent men there are sure to be unusual opportunities for advancement. I recall seeing at different times an advertisement in one of our leading trade papers calling for a gas engineer familiar with the design and construction of gas appliances, that ran for over a year without being filled.

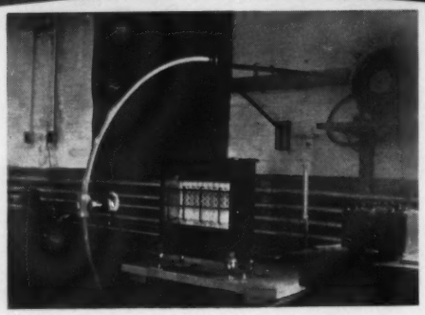
Leading men of the gas industry agree that it now stands on the threshold of a wonderful era of business expansion. After all, there seem to be no fundamental reasons why it should not. If our customers desire energy in the form of heat then gas, where available, is the logical fuel. I do not anticipate any serious competition in the future from electricity, solid or liquid fuel. The practice of transforming heat energy into electrical energy and then back to heat again, is not only uneconomical but scientifically unsound. Under such conditions only about 12 per cent of the original heat in a pound of coal is finally delivered to the customer, whereas in the case of gas about 80 per cent of the original amount of heat is supplied the customer.

In some territories, particularly the Northwest where cheap hydro-electric power is available in great quantities, gas companies are encountering considerable competition due largely to rates for electrical cooking and heating, which in face of the schedules for lighting, and certain other domestic purposes, seem difficult to justify. I believe these conditions however, will eventually adjust themselves, for the field of electricity is light and power. In traveling by rail between our various cities, particularly after collecting the usual quota of coal dust and cinders during the hot summer months, one cannot help but appreciate the wonderful opportunity that exists for the electrification of all railway lines and in this way, utilizing practically all of our excess power.

The possibilities of hydro-electric power development are very generally overrated. According to recent estimates there is actually available only about 53,400,000 horsepower throughout the United States, about 65 per cent of which lies West of the Rocky Mountains. Still further, a good steam plant can generate electricity now about as cheaply as water power, and the distribution of its current is not accompanied by the exceedingly large high power transmission line losses.

It does not seem likely that oil will ever become a real serious competitor of gas, at least not for any length of time. If the statements of most oil experts are correct, we may expect the price of oil to go up in the near future on account of the limited supply, whereas the cost of producing gas should gradually go down. The large investment necessary when installing oil burners for heating homes and the attendant difficulties of operation do not indicate that they will ever become very serious competitors of gas. As a matter of fact, it seems that the peak of this competition has been reached and outside of a few large industrial installations where the characteristics of oil make its use practical, it is believed that competition from this source will in general decrease.





TOP: *A general view of the gas range testing department of the American Gas Association Testing Laboratory at Cleveland.* LEFT CENTER: *Conducting a fire hazard test on a gas range.* RIGHT CENTER: *Iodine-Pentoxide apparatus for determiing completeness of combustion.* BOTTOM: *Determining radiant efficiency of radiant heaters.*

As far as our available supply of wood is concerned, we will undoubtedly in the not far distant future reach conditions somewhat similar to those existing now in some European countries, under which it will be unlawful to cut down a tree without first securing a permit. The rapidly diminishing supply of available fuel from this source places it in the same competitive position as oil.

COAL SUPPLY ASSURED

Scientists tell us that we have a sufficient supply of coal available to last for a thousand years. Coal is a practical fuel but its use in the solid form is accompanied by so many disagreeable features that in the not far distant future there will certainly be restrictive measures passed legislating against its general use. Doctors and municipal authorities in many of the large Eastern cities are now seriously studying the smoke evil. Quite a number of cities now have smoke ordinances which are sure to become more restrictive as people learn of the deleterious effects of smoke and its attendant gases on the human system. Considerable evidence has already been collected to show that the curve of respiratory diseases parallels the smoke curve. Further than this, it is becoming generally recognized that sunshine is a necessary factor to good health, all of which seems to point to the fact that gas will eventually become the generally accepted fuel. Advancements in the art of distributing gas will in the future undoubtedly result in many plants being located near the coal mines from which it will be transferred through high pressure transmission lines to the cities. These conditions should also bring about a greater use of our commodity in suburban territories.

House heating by gas is just in its infancy. To offset the winter peak that will result from this new load, refrigeration by gas and large industrial installations will be encouraged and secured. Water heating is also a heavier summer load, and for this reason will be greatly increased during coming years. New rates that will build and hold these classes of business will undoubtedly be

(Continued on Page 44)

Is *the* Electric Range Here *to* Stay?

A Pertinent Question *for* Gas Men *to* Consider

By CLIFFORD JOHNSTONE
Executive Secretary, Pacific Coast Gas Association

THE domestic load is still the backbone of the gas industry and anything that affects it is of importance to gas men. While the delicatessen habits of many people in our large urban communities probably offer the greatest threat to the domestic gas load, the intelligent effort of the electric industry to popularize the electric range is bearing fruit in increasing abundance and this should be noted by sales executives of gas companies.

In spite of the clamor of its proponents there has always been some doubt in the minds of central station executives as to the desirability of the electric cooking load. Lack of information as to its cost to serve, its load factor, its diversity, and its probable coincidence with the daily lighting peak have deterred many electric companies from pushing the electric range as actively as they have been urged to do.

A committee of the Northwest Electric Light and Power Association has been working for some time in an endeavor to answer some of these questions, and the data, collected entirely in the Pacific Northwest, were submitted to the National Electric Light Association at its convention last June. The investigation cost nearly $20,000, elaborate load tests being made with special instruments. The results should be of interest to gas men as they indicate that the diversity of range use is such that the cooking load becomes more desirable as the number of ranges connected increases and it can be generally expected that central stations having surplus energy will now put forth greater effort to sell and connect electric ranges.

FINDINGS OF REPORT

The general conclusions of the report are as follows:

It has been determined definitely that the range load is good business for the power company which has the rate to support it.

The electric range is one of the most practical heavy current consuming devices that can be sold to residential consumers.

It returns a total revenue per dollar of investment which compares favorably with that derived from any other class of business.

It returns a total revenue far greater than any other generally accepted domestic application, including lighting.

Clifford Johnstone

The range added to the average residential installation will increase the annual load factor to 20 per cent from 12 per cent.

It is a soundly developed device and can be supported by the central station company. It also paves the way for other heavy current consuming appliances in the home.

The electric range is an excellent appliance which will supply the income to support the increased investment cost of rebuilding and revamping distribution systems to heavier capacity.

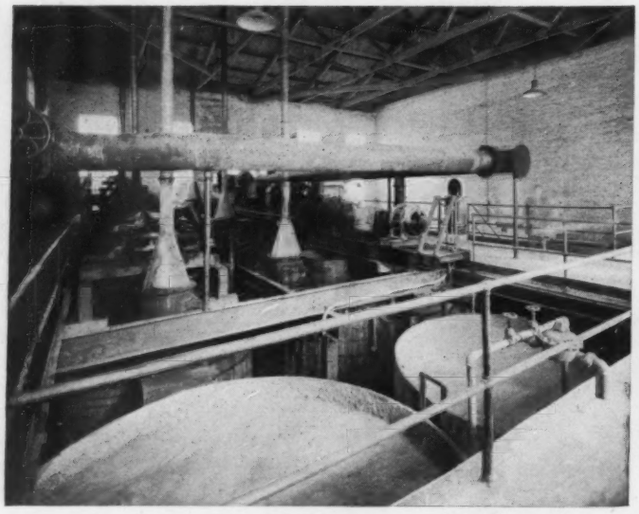
While the maximum demand of a single electric range was found to average 3.61 KW, this decreases to about 1 KW for 50 ranges, .87 KW for 150 ranges and .7 KW for 5,000 ranges. Based on 150 ranges the diversity factor is 4.3 and the annual load factor 18.9. While the daily peak was reported not to coincide exactly with the lighting peak, the curves show the lighting peak to lag only about 15 minutes leaving about 75 per cent of the cooking peak in practical coincidence.

The energy consumption per range per year averages 1425 Kwh, or about 4 times the lighting consumption. The annual energy consumption per KW of demand averages 1655 Kw hr returning a revenue, at a 4-cent rate, of $66.20 per KW of maximum demand. Northwest companies are successfully promoting the electric range business at rates up to 5½ cents per Kwh.

The committee did very little toward investigating the electric water heater load, this being left to the Pacific Coast Electrical Association. The report indicates, however, that without the electric range and the double throw switch, the electric water heater can make no headway.

This report should in no way alarm the gas industry as it merely indicates that the cooking load now served so satisfactorily by gas has been found desirable by the electric men. The gas range will do everything and more that an electric range will, and do it cheaper, and the only danger lies in the possibility of superior service and salesmanship on the part of the electric range man. The proof of this is found in a news item appearing in the November Gasco Bulletin published by the Portland Gas & Coke Company, a successful gas company in the heart of the electric competition belt. We quote as follows:

"Old prejudices against the use of gas equipment in schools are being overcome. The Milwaukee schools after a year's experience with electricity for cooking purposes have replaced it with gas. Hotel units have been installed in the cafeterias of the Milwaukee grade school and Junior high school and a gas range has replaced the electric range formerly in use in the domestic science laboratory of the Junior high school as the result of some exceptionally fine work on the part of Messrs. Calhoun, Stephens, Coblentz and Harlow. They met with the committee on October 22 and were finally successful in securing these orders. In the Milwaukee grade school an electric range was installed over a year ago, but because of its slowness of operation was unsatisfactory. It was necessary for those wishing to prepare lunches to begin at seven o'clock in the morning in order to have lunch ready by noon. In the Junior high school lunches were being prepared on a few old gas hotplates. The school board was not interested in gas equipment and, in fact, was considerably prejudiced against it. Mr. Calhoun, however, was not satisfied with what appeared to be a perfect job, but immediately sold gas ranges to both members of the committee for their homes."



LEFT: Apparatus for sulphur precipitation, installed at Potrero gas plant of Pacific Gas and Electric Company, San Francisco.
RIGHT: A few hundred tons of the precipitated sulphur paste

New Process *for* Removal *of* Sulphur Yields Valuable By-Product

By W. S. YARD

Vice-president in Charge of Gas Construction and Operation, Pacific Gas and Electric Co.

A NEW process for the removal of sulphur compounds from manufactured gas was perfected and placed in operation by the Pacific Gas and Electric Company during 1925. This is of importance for the reason that it is the first instance in which the sulphur removed from manufactured gas has been recovered as a marketable by-product. The process can and, doubtless, will be adopted in all the larger gas plants of this company's system.

The form of sulphur produced is more efficient in insect control and will probably be a more active fertilizer than any form of sulphur yet produced upon a commercial scale. This innovation in the gas industry is, therefore, of vital importance to the agriculturist and may finally prove to be of general value to the public by making the gasification of high sulphur fuels profitable.

RESEARCH OVERCOMES OBSTACLES

The story of this achievement is instructive because, from a technical standpoint, another step forward has been made, and because its accomplishment has been a succession of triumphs over obstacles varying widely in character and involving principles drawn from the results of the most recent researches. The presence of sulphur in the crude manufactured gas is due to the sulphur compounds in the oil or coal from which it is made. Although limitations as to their percentage are placed upon the producers it is impossible to obtain materials that are entirely free from them. The gradual exhaustion of the supplies of the high grades of both oil and coal makes it more and more difficult to obtain fuels of a standard purity. The gas companies, therefore, do not see their way to abandon their gas purifying apparatus but must plan to improve them and increase their capacity. Any marked improvement is of great importance as it will make available to the industry cheaper fuels which it has not been able, so far, to use.

The first method of purifying manufactured gas consisted in passing the gas through layers of slaked lime. After this lime became saturated with sulphur it was replaced with a fresh supply. The spent lime was a very disagreeable waste. Its disposal was difficult and increased the cost of operation which was otherwise already quite high due to the fact that large quantities of fresh lime were required. This method was later replaced by using iron oxide. The iron rust was prepared artificially by various means and deposited upon the surface of shavings. This gave a porous mass through which the gas was easily passed. The iron oxide absorbed the sulphur from the gas. This material was much better than the lime because by exposure to air it could be revived and used again many times before discarding, and its disposal was less troublesome. The iron oxide method is still in almost general use.

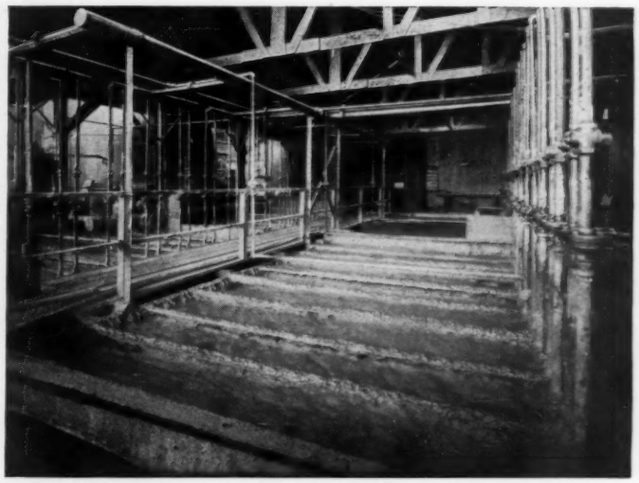
In 1921 there was introduced a process in which a soda ash solution was used for scrubbing gas and the solution was revived by spraying it into a scrubbing tower through which air was blown. There were two distinct advantages in the soda ash method. The apparatus required occupied much less ground area for a given capacity than did the iron oxide method and the cost of operating was lower. There was, however, a very serious objection to this process. When the soda solution was revived in the scrubbing tower through which air was blown, a foul smelling gas was occasionally released at the stack. The Pacific Gas and Electric Company adopted this process, however, believing that through scientific means it would be found possible to eliminate this disagreeable feature. Two methods were proposed, one consisting of dilution with large volumes of air, the second the burning of the hydrogen sulphide. These, however, were not entirely satisfactory, for while eliminating the odor they still permitted the sulphur compounds to be discharged into the atmosphere.

Further improvement of the process was undertaken. Research chemists

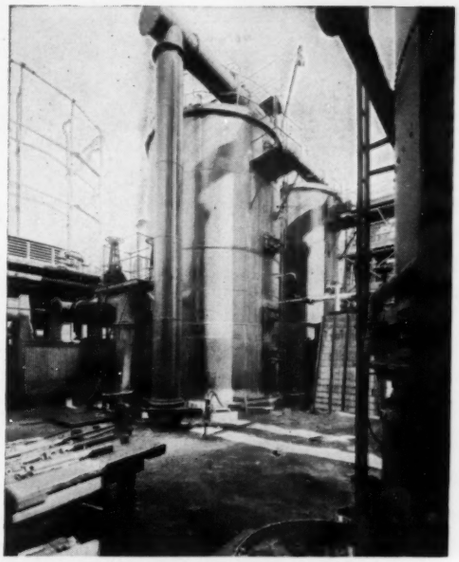
were consulted and employed. A definite line of procedure was adopted and laboratory work begun. During the research work a chemist, while making a certain experiment, omitted one of the ingredients and thereby accidentally discovered a short cut in the process. Further laboratory tests proved the method by which the sulphur could be recovered. But, the reaction was slow and incomplete. During the study of the rate of reaction, another chemist found that by stirring the solution with an egg beater the reaction could be carried to completion in a few minutes. This led the study into the development of an apparatus for accomplishing the same chemical results upon a more extensive scale and, at the same time, sufficiently economical in power consumption.

THREE TYPES OF APPARATUS

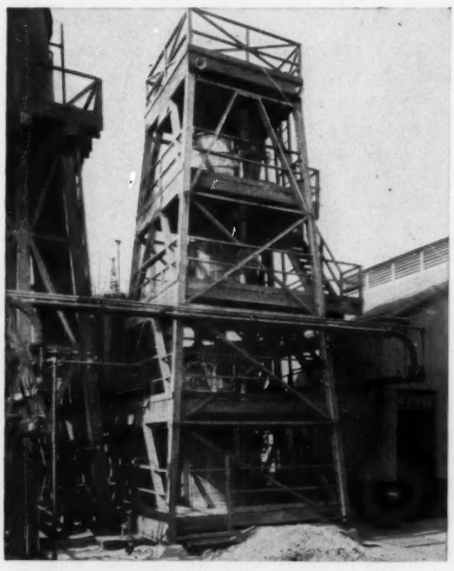
Three different types of apparatus were selected and installed severally in the gas manufacturing plants in Oakland, San Francisco and San Jose, where after operating difficulties had been adjusted there was accomplished the production of a precipitated sulphur which was filtered from the solution and delivered to bins in a paste form containing about fifty per cent water. Examination was made of the physical and chemical characteristics of this paste, in order to find out whether it possessed any commercial value and by what means it could be prepared for market. This investigation is not yet concluded, but the results already obtained are sufficiently conclusive to allow of certain deductions.



The Oakland plant installation for precipitation of sulphur



Absorbing towers at P. G. & E. San Jose plant



Sulphur precipitation apparatus at San Jose plant of P. G. & E.

This sulphur, for instance, has proven to have certain characteristics which make it especially valuable as an insecticide. Being a precipitated sulphur it is of very fine structure, so fine that it is almost collodial. It seems to carry with it certain impurities which really are of advantage. Once dried it seems to be readily wettable, and when used either wet or dry adheres to surfaces tenaciously, and for that reason is highly efficient for the purpose indicated. A fine sulphur that may be dusted or readily held in liquid suspension has been sought by the sulphur industry. The agriculturist has for some years used sulphur for an insecticide but has had difficulty in finding a form of sulphur which would give satisfactory results for eliminating the red spider and controlling mildew, especially in the early spring, when the temperature is still somewhat low. It is believed that a finely divided sulphur, if produced cheaply enough, would serve this purpose. Experiments conducted at the University of California and in the field indicate that sulphur precipitated from gas manufacture is adaptable to and does satisfy that purpose.

The agriculturist also may use sulphur for fertilizing. It has been found that sulphur is valuable for reclaiming swampy lands. Certain crops cultivated upon delta lands respond to sulphur as fertilizer. Sulphur mixed with pulverized phosphate rock slowly oxidizes and then acidifies the phosphate, gradually making it available for plant use. Such a mixture eliminates the usual and more expensive procedure of acidulating the rock dust in order to produce a soluble phosphate. This soluble phosphate has the disadvantage in that although it is immediately useful to the plant, frequent applications are required. This finely divided sulphur when mixed with ground phosphates may be expected to hasten the oxidizing reaction and thus be more efficient than the ordinary forms of sulphur.

PER CENT OF RECOVERY

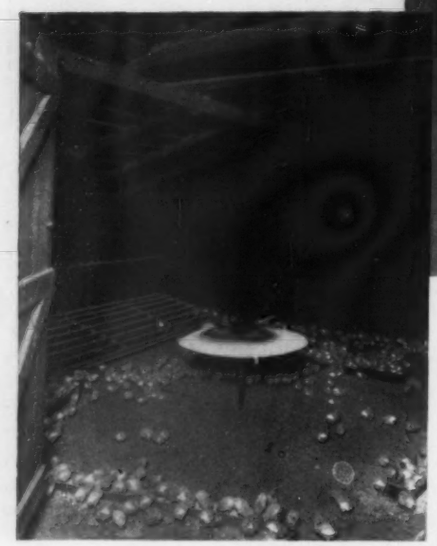
Although there are but 200 to 300 grains of sulphur compound per thousand cubic feet in the crude manufactured gas, the volume of gas made in the plants where this process is adaptable is so large that the annual production of sulphur is considerable. In Oakland the recovery varies from 50 to 80 per cent, in San Jose from 65 to 90 per cent and in San Francisco at the present time the recovery is practically one hundred per cent. In approximately fourteen months of operation these three plants have produced about 1500 tons of dry sulphur. With the completion of installations now under way, there will be produced from 2500 to 3000 tons of dry sulphur per year. A fair price for this sulphur will add materially in keeping the cost of purification within reasonable limits and give to the agriculturist a product which he has not had heretofore.

Two methods have been perfected for freeing the sulphur of considerable of its moisture, yielding a crude product which can be used in the manufacture of

(Continued on Page 56)

The view at the right shows two 32,000-egg "Wishbone" mammoth incubators on the lines of the Southern California Gas Company, with gas-fired boilers in the foreground. By adding another tier to those shown, the capacity of the incubators can be increased fifty per cent.

Below is a typical Southern California brooder house, a colony type gas-heated hover shown in the center.



Gas Solves Heating Problem *for* Commercial Hatcheries

By H. E. DAVIDSON
Southern California Gas Company
Glendale, Calif.

THE industry of artificially hatching and brooding chicks on a commercial scale is one of comparatively recent development in this country, although the art was known to the Egyptians and Chinese before the Christian era. Historians tell us that these earlier hatcheries, and particularly the Egyptian, produced hundreds of thousands of chicks each year—a surprising output, considering the crude equipment used.

Heat was supplied by radiation from the stone or brick walls of the incubator itself, which was fired with various materials. Temperature regulation and ventilation were left to chance and the skill of the operator, in marked contrast to the most modern practice, wherein gas is utilized for heating, and temperature control and ventilation are automatic.

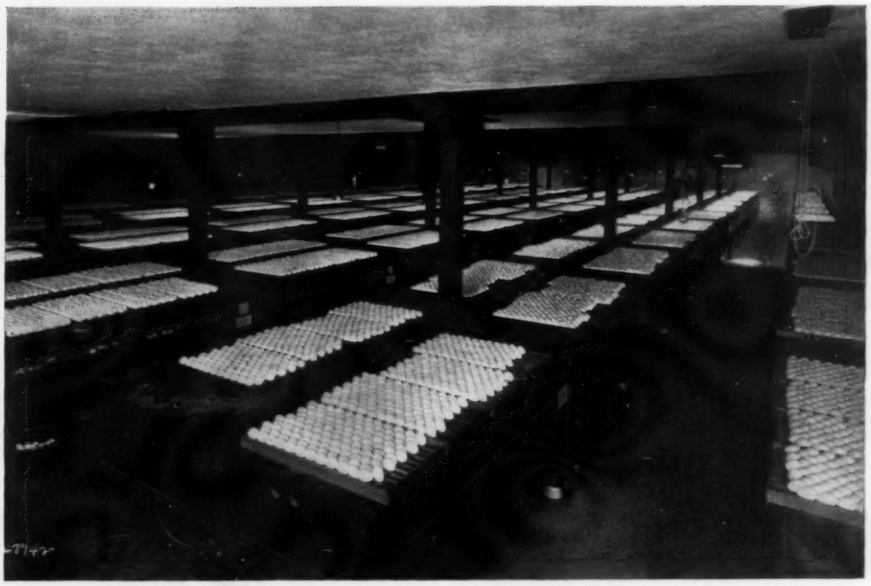
In Southern California commercial hatcheries vary in capacity from a few thousand to a quarter of a million chicks every three weeks. These plants operate throughout the year, with the general exception of the latter part of May and July, and the earlier part of August. Gas is preferred to electricity for heating by most operators on account of the lower cost and the continuity of service. Kerosene is sometimes utilized, but is not as economical, convenient or safe as gas, and as a rule is used only when the latter is not available.

Several different types of gas-fired incubators are used, varying in method of application of heat as well as in capacity. The five hundred egg machine is the smallest in commercial use, while the so-called "mammoth" types are made in capacities running up to nearly fifty-thousand eggs. Many hatcheries use only incubators of identical type and capacity, while others employ machines differing radically from each other in size and operation.

In artificially hatching eggs there are several essential conditions which must be attained, regardless of the type or capacity of the incubator. Proper temperature, humidity, and ventilation must be maintained, while the eggs must be turned or shifted in position two or more times daily. Temperature control is automatically obtained in all machines by means of a thermostat, while the other requirements are met in varying ways in the different machines.

In the typical small gas-fired incubator with a capacity of about five-hundred eggs, a single burner is used to heat either air or water, which in turn is circulated through the machine. Gas is burned at a fixed rate, high or low depending upon weather conditions, and temperature control is obtained by means of a small damper on top of the machine. This damper, which is controlled by a thermostat set to maintain the required temperature, generally 103°, opens when the temperature becomes too high, and allows some of the heated air to escape. A humid atmosphere is obtained in each compartment by means of a moisture pan, while ventilation is secured by allowing a small amount of fresh air to enter the bottom of the egg chamber, and a corresponding amount of stale air to escape from the top. The turning of the eggs is done by removing each egg tray from the machine, and by a quick motion tilting the eggs (which are placed in the trays in an inclined position, on end) to the opposite slope from which they were previously. Once a day the eggs are allowed to cool by removing the trays and placing them on top of the incubator for a suitable length of time. In hatcheries using this type of machine, and which are located in areas with hot summer weather, provision must be made to secure a room temperature of less than 103°, in order that the damper control can function.

An adaptation of the small machine principle to a unit of large capacity is



A portion of one large hatchery, showing 132 "Jubilee" incubators of 540-egg capacity each, with egg trays placed on top. This plant has 410 such machines, giving a total capacity of nearly 225,000 eggs. Gas-burning equipment has replaced the oil pots which can be seen at the foot of the incubators in this picture.

exemplified by the "Wishbone" mammoth incubator. This machine consists of a number of separate egg compartments joined end to end in a long row, with possibly one or two more rows above the first. This method is quite flexible, as additional capacity may be obtained by adding additional units to the first or bottom row up to a total length of about a hundred feet, then adding units to the second tier until it is complete, and finally by building the third tier; each one of these tiers has space for sixteen thousand eggs. All compartments are heated by hot water piping running from one end to the other of each tier, and supplied from a small gas-fired boiler. A thermostatic control maintains a temperature of about 150° in the water as it leaves the boiler by varying the flow of gas to the burners. Proper air temperature (103°) humidity and ventilation are attained in each compartment of this machine as in the small type previously described; the turning of the eggs, however, is accomplished by a mechanical device which greatly shortens the time required. The eggs rest upon rollers, all of which, tier by tier, may be revolved by simply moving a lever at one end. The movement of the rollers under the eggs causes the latter to revolve, and in this way fifty or sixty thousand eggs may be turned in three or four minutes.

Interior of a 47,000-egg "Smith" incubator, with hatching trays at the bottom drawn out into the center isle to show chicks. There are about 3,000 of them in sight. Gas-fired boiler equipment is used with this incubator.

CABINET TYPE INCUBATORS

In addition to the "Wishbone" machine, there are two other mammoth incubators for which gas is the ideal fuel. These differ radically in construction from the former, being of the cabinet type and quite compact. The smaller of the two, the "Buckeye," is made in six, nine, ten and twelve thousand egg sizes; the egg trays are placed in and removed from the machine through doors in the sides, and are supported inside at an angle on vertical rods. As incubation proceeds, the trays are periodically removed and replaced in a lower position on the rods until a few days before hatching they are at the bottom; they are then removed from the rods and placed in hatching compartments below. At the time the lowering is done, trays with fresh eggs are placed in the top positions, thus making the hatching a more or less continuous process. Turning is accomplished in a few minutes by a mechanism which tilts the trays in the opposite direction through motion of the supporting rods. The heating system is of the indirect type; hot water from a small boiler provided with a gas burner is circulated through piping in a chamber at the top of the cabinet. Three electric fans drive fresh air across this piping and thence through the machine, thus heating and ventilating at the same time.

A thermostat maintains an interior temperature of 100° by controlling the circulation of hot water. A second thermostatic device insures an even temperature in the circulating water, either by regulating the gas flow to the burner or by operating a damper at the top of the boiler. Humidity is obtained through the use of moisture trays placed in the heating chamber.

The "Smith" incubator is a further development of the cabinet type, and is made only in one size. This is ten feet wide, thirteen feet long and eight feet high, and has a capacity of forty-seven thousand eggs, or two and one-half tons. The egg trays are suspended on chains on either side of a central aisle; turning (which may be completed in two minutes time) and lowering the trays, are done simply through motion of the chains. Like the "Buckeye," the "Smith" machine is indirectly heated, but with steam instead of hot water. A thermostat set to maintain a temperature of 99° controls the flow of steam from a vertical boiler, while an automatic governor insures a uniform boiler pressure by regulating the gas fire. Four electric fans draw fresh air from the outside through the steam coils in the heating chamber at the top and force it downwards into the center passage, and thence upwards on both sides through the egg trays. As in the "Buckeye," this forced draft provides ventilation as well as heat; a complete air change is made every three to four minutes. In addition to the steam coils, others for cold water circulation, are provided, so that in very hot weather the interior temperature may be kept down to 99°. A small jet of live steam blowing into the heating chamber provides adequate moisture; the amount may be varied by using different sized orifices.

(Continued on Page 55)

Campaign *for* Water Heater Sales *Is* Conducted *in* Northern California

By W. H. MIXTER
Domestic Gas Sales Engineer, Pacific Gas and Electric Company

IN the Northern California territory served by the Pacific Gas and Electric Company surveys made in 1925 showed that only a relatively small percentage of gas consumers enjoyed adequate hot water service. Several explanations for this condition were offered. The Pacific Gas and Electric Company does not merchandise gas appliances, leaving this activity entirely in the hands of dealers. Water heater sales are aggressively promoted in the larger centers of population by the manufacturers' representatives, who in most cases conduct a retail as well as a wholesale business. They have not found it profitable to go into the outlying territories to pioneer water heater sales by direct selling, or by offering continued assistance to local dealers and plumbers.

A novel sales and publicity campaign was instituted by the Pacific Gas and Electric Company for the purpose of bringing before their consumers the story of automatic hot water service, developing prospects for water heater sales and demonstrating to dealers that the automatic type of water heater could be sold in the smaller communities; and also of surveying the field to determine the degree to which it was saturated.

DEALERS GET PROSPECTS

A crew of salesmen, properly trained and adequately supervised, was sent from one locality to another, remaining only long enough to complete a house-to-house canvass of the territory. Prospects which were pending at the end of the brief campaign were turned over to local dealers and manufacturers' representatives for follow-up.

Local plumbers were given all of the installation work by the Pacific Gas and Electric Company. A standard of quality for installing water heaters and a new and proper level of prices for such work was established, which should make it much easier for the plumber to sell the proper kind of installation in the future.

Salesmen were provided with survey cards on which the names and addresses of the gas consumers in the town were addressographed. Preceding the salesman's visit, and preparing the way for

HOT
Water!
Without Delay, Bother or Thought
The new Automatic Gas Water Heaters supply abundant hot water - - all you want any time of the day or night.
INTRODUCTORY OFFER
Automatic Gas Water Heaters
For a short time only, Automatic Water Heaters will be sold by the Pacific Gas and Electric Company
During this brief introductory sale, Water Heaters will be completely installed for—
$5.00 Down
—and the balance in twelve easy monthly payments with your gas bills. Old tank heaters will be accepted as first payment on a new Automatic Water Heater
A special representative will call at your home and present further details about this offer.
Here's an opportunity to secure from our representative a durable Gas Water Heater that will supply gushing hot water at the turn of the faucet
This Offer—For a Short Time Only
We recommend both the automatic storage and instantaneous types of water heaters. During this brief introductory offer we are selling any standard make of water heater you desire.
Local dealers displaying this emblem sell dependable water heaters throughout the year
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and·E·
Owned·Operated·Managed by Californians

Some of the newspaper "copy" which supplemented direct sales work in the recent Pacific Gas and Electric Company campaign on water heaters

him, a letter was sent to each gas consumer, and newspaper advertising also told the story.

As an additional publicity feature, water heaters were displayed in various grocery stores, dry goods stores, banks, etc., for a week prior to the opening of the campaign in each city. Tickets were given away at each display and an automatic water heater awarded to the holder of the lucky number following the drawing. In San Jose 40 local stores carried displays of water heaters in their windows for the week preceding the campaign. On the morning that the campaign opened a special free entertainment was given by the Pacific Gas and Electric Company in the California Theatre, at which time, in addition to a program of moving pictures, etc., four water heaters were awarded to the holders of the lucky numbers drawn.

The outstanding accomplishment of this campaign was the fact that approximately 70,000 people received the message of adequate hot water service, and over 40,000 people were personally interviewed by the gas company's salesmen. Such publicity is bound to make the sale of automatic water heaters easier in those communities where they had never before been pioneered.

The actual results of the campaign are shown by the following tabulation:

Salesman-weeks	500
Average number of salesmen	13
Actual number of interviews	41,535
Water heaters sold	1,267
Total amount of sales	$102,150.08
Average value per sale	$81.20
Sales per man per week	$2.52
Prospects developed (not sold)	3,693
Range and heating prospects developed	740

Aside from direct sales and prospects developed, one of the most valuable parts of the campaign work was the inventory of appliances which indicated the degree to which the market was sold. The following tabulation shows a tremendous field for the sale of both automatic and tank type water heaters. The figures quoted are estimates made from an investigation of several thousands of the survey cards filled out by the salesmen.

Cities	Per cent Using Automatic Water Heaters	Per cent Using Tank Water Heaters	Per cent Using No Gas Water Heaters
Chico	12	45	43
Red Bluff	7	55	38
Redding	17	45	38
Grass Valley	9	29	62
San Jose & vicinity	12	76	12
San Rafael, Santa Rosa, Vallejo, etc.	12	60	28

DEALER SALES DOUBLE

The 3693 prospects which were turned over to local dealers at the close of the campaign are being followed up by personal letters from the manufacturers' representatives, and personal calls by them and by local dealers. Reports from several communities indicate that dealer sales have more than doubled in the months following the campaign.

Organizing *an* Entire Company *for* Customer Ownership Sales

By JAMES L. STONE

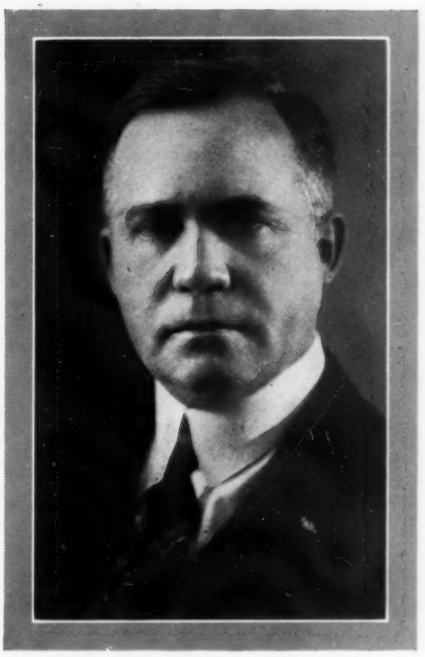
Vice-President and General Manager Spokane Gas and Fuel Co.

BEFORE giving you some information relative to our activities for the past two years in customer ownership work, it will perhaps be desirable to tell you something of the organization which these activities were designed to serve.

The Spokane Gas and Fuel Company is a subsidiary of Cities Service Company. The subsidiaries of Cities Service Company number more than one hundred and stretch across the continent from the Atlantic to the Pacific Coast, and from lower Canada into Mexico, comprising a large and successful public utility system which includes gas, electric light and power, heat, ice, water and street railway companies, combined with extensive natural gas and oil producing, transporting, storing, refining and manufacturing properties.

The firm of Henry L. Doherty & Company is the fiscal agent and operating manager of Cities Service Company and was established in 1905 for the purpose of developing and financing public service companies which presented promising possibilities in future growth.

Cities Service Company was organized in 1910 as a holding corporation for the numerous enterprises of the Doherty organization. The company had for its inspiration, the indefatigable effort and vision of its organizer, Henry L. Doherty, who was one of the earliest men to advocate customer ownership of public utilities. His dream of customer ownership is fast being realized. Figures for the year 1925 show that 48,252 customers and friends of the various organizations in Cities Service Company bought 176,550 shares of stock from employees. Results in 1926 showed accomplishments equally as good. It is the goal of the organization to have every one of its customers a part owner in the company.



James L. Stone

A PROBLEM IN EDUCATION

Most of the properties in the Cities Service Company are located from Denver on East. The Spokane Company, being more or less isolated from the rest of the properties, was one of the last ones to take up the customer ownership program. This property being so far removed from the rest made the selling of securities more of an educational problem than was the case in most of the other properties. At the beginning it took more time to acquaint customers with the many facts concerning the activities of the organization as a whole. The first few months of activities in this work, naturally, were the hardest. Today Cities Service Company activities and its securities are as well known in Spokane as any other organization or security sold here.

In January, 1925, we organized the Full Time Securities Department under the direction of a Securities Sales Manager, and the men in this department spend their full time on security sales.

In March, 1925, we conducted our first ten-day employee sale, all of the employees participating with the exception of the members of the Full Time Department. These employee sales are conducted every six months. In September, 1926, we completed our fourth employee sale.

ORGANIZING FOR SELLING

Before each ten-day sale, group meetings of the entire organization are called for the purpose of educating the employees in the securities to be sold and on the various activities of the organization. Several departmental meetings are also held before the sale starts. Inspirational group meetings and departmental meetings are held also during the ten-day sale.

Employees are given blank prospect cards and twenty or more of these prospect cards are filled out and handed in by each employee. Each of these pros-

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ANALYSIS OF FOUR TEN-DAY EMPLOYEE SALES, CONDUCTED BY SPOKANE GAS AND FUEL COMPANY, SHOWING DISTRIBUTION OF SHARES PER SALE.

No. of Shares Per Order	*March, 1925*		*September, 1925*		*March, 1926*		*September, 1926*	
	Sales	*Shares*	*Sales*	*Shares*	*Sales*	*Shares*	*Sales*	*Shares*
1	198	198	140	140	187	187	177	177
2	72	144	62	134	72	146	66	132
3	30	90	16	48	37	111	20	60
4	10	40	3	12	8	32	14	56
5	42	210	36	180	32	160	51	255
6	9	54	5	30	12	72	8	48
7	3	21	2	14	3	21	1	7
8	1	8	3	24	4	32	3	24
9			2	18	1	9	1	9
10	17	170	13	130	12	120	18	180
11	2	22	3	33			3	33
12	3	36	3	36	5	60	4	48
13							1	13
14	2	28			1	14		
15	1	15	2	30				
18					1	18	1	18
20	2	40	4	80	3	60	3	60
21							1	21
22							1	22
23	1	23						
25			3	75	1	25		
30			3	90	3	90		
35	1	35			1	35		
36					1	36		
37					1	37		
38	1	38						
44							1	44
50					1	50		
60					2	120		
	395	1172	300	1074	388	1435	374	1207

PACIFIC COAST GAS ASSOCIATION

A Department Conducted by Clifford Johnstone, Executive Secretary

M. F. Wales to Chairman Santa Cruz Convention

Morris F. Wales, General Agent of the Coast Counties Gas & Electric Company, has been appointed by President Yard as chairman of the 1927 Convention Committee. Mr. Wales is the right man in the right place and the Association is very fortunate to have him accept this responsibility. While not definitely decided it is probable that the convention will take place during the week of September 19, 1927. Headquarters will be at Hotel Casa de Rey, Santa Cruz, Calif.

Committees Get Into Action

Many of the Association's committees are now completely organized and well started on their labors. Following the discussions at the San Francisco conference the section programs were revised in line with the interest evinced by volunteers. The volunteer system has been of great aid to the Section Chairman as it has enabled them to design programs which will have universal interest and to pick men who can handle the subjects to the best advantage. About twenty per cent of the Association's membership volunteered for committee work. A full record of committee personnel will appear next month.

1926 Proceedings off Press

Volume 17 of the Association's proceedings were mailed to members early in December. The summarizing of many of the reports and all of the discussions is an innovation which will undoubtedly create comment. It was done chiefly to reduce the expense of the publication which would have run close to twelve hundred pages if the material submitted had been printed in full. We believe that the book has been made easier to read and of more value as a reference source by this procedure.

Regional Conference Due In Los Angeles

The dates for the Southern Regional Conference have been definitely set as February 23 and 24, 1927. The conference will take place in Los Angeles and an elaborate program is now being arranged and will be announced next month.

R. D. Compton Has Place in P.C.G.A. Golf History

PACIFIC Coast Gas Association has at last achieved a real claim to fame through the fact that one of its members has made a hole-in-one. The member thus raising the gas industry above the rut of the commonplace is R. D. Compton, who, while not playing golf, is assistant to our president, W. S. Yard. The deed was accomplished on December 5th on the 16th hole of the California Golf Club in San Francisco, and its truth cannot be gainsaid, as it was witnessed by no less a personage than D. F. Foote, Vice-President of the Pacific Gas & Electric Company.

R. D. Compton

Mr. Compton is the fifth member of the California Golf Club to have his name inscribed upon the silver plaque reserved for its hole-in-one club and has been busy ever since receiving congratulations from his friends. W. M. Thompson, Chairman of the Association's Golf Section, has taken cognizance of the affair, and coupling it with the fact that Mr. Yard was the winner of the Basford-Pedersen-Babcock trophy at the Pasadena convention, is planning to place severe handicaps against the Gas Department of the Pacific Gas & Electric Company in future tournaments.

COAST MAN IN PANAMA

M. J. Gaustad, formerly with the Sacramento Gas Company, left San Francisco on December 18 for Colon, Panama, where he will join the organization of the Panama-Colon Gas Company. The Sacramento Gas Company has been taken over by the Pacific Gas & Electric Company.

BOOK ON UTILITIES USED IN COLORADO SCHOOLS

A book entitled "A Glimpse of the Public Utilities Industry" has been published by the Rocky Mountain Committee on Utility Information, and is being used by a number of high schools as a text in courses on the utility industry.

Transcript of Proceedings at San Francisco Meeting

This summary of the reporter's transcript of the Commercial and Technical sessions at San Francisco on November 18, 1926, gives only the high lights of what the transcript reveals to be the best and most informative discussions ever held by the Association. Only that material is given here which may be considered to have immediate reference value. The balance of the transcript has been furnished to the committee organization to aid them in their work.

TECHNICAL SECTION

President W. S. Yard Presiding

DEHYDRATION

W. S. YARD *(San Francisco):* We are here to engage in an informal discussion of various subjects of interest to engineers. The first matter to be taken up is dehydration of gas. We are all aware of the necessity of sending out a drier gas, because we find, upon investigation, that moisture causes trouble in our mains and meters.

L. M. KLAUBER *(San Diego):* A paper on dehydration of gas read before the American Gas Association in October by F. W. Sperr, Jr., of the Koppers Company, has definitely formulated the problem before us. We began the dehydration of all our gas in San Diego early in the fall and immediately noticed its effect on our meter diaphrams. A number of Pacific Coast plants operate combined low and high pressure systems and these are peculiarly well situated to undertake dehydration by compression. As was pointed out at the Pasadena Convention, many companies have a large investment in compressor capacity, much of which is used only for the few days of the winter peak. This capacity is available for the dehydration of all the gas for possibly 90 per cent of the time. While compression is not the only means by which gas may be dehydrated, and is possibly not the best means, it appears to have many advantages for us. One of the attendant problems is the matter of cooling the gas after compression. Salt water must be used where available owing to the expense of fresh water. The relative merits of tubular after-coolers or cooling by direct scrubbing have not been definitely worked out. Dehydration is bound to come and we expect to save enough in our meters alone to pay for its cost.

R. M. MCCALLEY *(Portland):* About 30 per cent of Portland's gas is sent out

high pressure. We have been studying the problem of internal corrosion for some time and while we have found that oxygen and possibly cyanides are its prime causes, yet these agents cannot act except in the presence of moisture. The prevention of dust and scale is therefore intimately connected with the removal of moisture.

VAN E. BRITTON *(Oakland):* In the East Bay Division of the Pacific Gas and Electric Company all of the gas is compressed, although about 30 per cent of it is distributed at low pressure through district governors. We have found a considerable change in the quality and quantity of condensate removed from the drips. It formerly required two drip trucks to take care of the drippage of 1500 miles of main. Since the installation of after-coolers one truck has been sufficient. On the high pressure mains which radiate North and East about 15 miles each, there is very little condensate beyond a half mile from the plant. We find also that the sticky substance which formerly gave us trouble in regulator valves has dried up.

J. M. DICKEY *(San Francisco):* Last Spring we put in an after cooler on our high pressure which varies from 5 to 35 pounds at the works. About 35 per cent of San Francisco gas is high pressure. The drippage pumped on the high pressure system is now negligible and we have noticed no detrimental effect on the gas. Unfortunately the average temperature at the plant location is somewhat higher than through the bulk of our distribution system and the condensate handled on the low pressure system is tremendous. No decision has been made as to how to correct this condition. On our high pressure we are using cooling towers and fresh water.

R. H. HARGREAVES *(San Jose):* We experience considerable dust on our high pressure system. On our low pressure system a drip wagon is working continuously on 250 miles of main. Moisture accumulates in house lines and sometimes gathers in meters so that they run fast. This condition is practically non-existent on our high pressure lines.

W. S. YARD *(San Francisco):* The thing of prime importance in correcting this condition is the inconvenience to our customers. I am not sure whether it will be economical to compress all gas and then cool it, especially in large cities. Where outlying holders exist the gas would possibly be saturated again.

L. M. KLAUBER *(San Diego):* We have serious dust trouble in our high pressure lines. I am of the opinion that with proper aftercooling this dust will disappear.

W. S. YARD *(San Francisco):* I think that one of the most serious dust pro-

(Continued on Page 40)

COMMERCIAL SECTION

L. F. Galbraith Presiding

PRESIDENT W. S. YARD: I feel that the commercial activities of the Association have been neglected. The technical men are in a position to manufacture more gas than there is an outlet for. A strong and continuous commercial program is needed.

INDUSTRIAL SALES

C. M. GROW *(Los Angeles):* We have learned that there is hardly any limitation to the use of gas in industry—and this even applies to manufactured gas. To sell industrial gas you must make a survey of your field, classify your industries and then if you have a proper knowledge of what gas will do and a proper knowledge of operating conditions in the industrial plant you are in a position to sell the gas and keep it sold.

Down south we have gone through the period of trashy installations, the wrong burner in the wrong place; we have gone through the period of inventing burners; we have gone through the period of trying to do everything with high pressure gas and we have finally concluded that the surface combustion principal, for many, many uses, expensive as it is, is the last thing in application. Nine furnaces we are building now are to be fired with low pressure gas. They are to be insulated and have the smallest possible area. Three are to be controlled by pyrometer and the others by ordinary temperature controls.

GAS IN WHITE LEAD MAKING

HERBERT HAAS *(Oakland):* We are working with manufactured gas which costs 15 cents a therm for usage of 200,000 cubic feet per month and 10 cents a therm for usage of two and a half million cubic feet per month. We have to compete with oil at 2 cents a therm. Notwithstanding this disparity it should not be taken for granted that it costs more to use gas than oil.

Mr. Haas then described in detail The National Lead Company (Oakland) installation manufacturing white lead, litharge and red lead. The plant has eight large furnaces and the ratio of fuel cost was 1 to 7 in favor of oil. Nevertheless the plant was converted to gas with the result that the annual fuel bill has been reduced from $12,000 to $10,000; the capacity was increased so that six furnaces do the work of eight and furnace maintenance charges of $300 per month have been entirely done away with.

H. M. CRAWFORD *(San Francisco):* Mr. Haas' exposition proves that no phase of the gas business requires more technical training than the sales end pertaining to industrial applications.

CREAMERIES

C. A. CARLSON *(San Francisco):* Oil competition has seriously affected the use of gas in steam boilers, this use now being restricted to the smaller units. It is therefore difficult to secure the creameries' business as their use is largely for making steam used to sterilize bottles. As steam is used in open jets there is a great deal of waste. Pasteurizing costs about 5 to 6 cents per gallon on manufactured gas and 2½ to 3 cents on oil.

LAUNDRIES

RAY TROWBRIDGE *(San Francisco):* We have laundries on our lines using 120,000 cubic feet of gas per month. The average is 30,000. Gas is used on ironing machines, for the heating of water and in drying rooms. The modern laundry equipment is mostly heated by steam and this is usually furnished by oil-fired boilers. Some laundry operators do not like this equipment, however, claiming to get better and more work on the older types. The greatest possibility for new business lies in drying and water heating.

RESTAURANTS AND BAKERIES

WM. MARKS *(Oakland):* There is a great deal of potential business to be developed in the restaurant field and this is desirable because of its load factor and ease of serving on existing lines. The competition is keen and requires careful ground work, of which the survey is the back bone. Every assistance should be given the architect, but the best way to sell the architect is to sell his client. However, good service is the greatest ally of the salesman in securing and holding business. That gas is the ultimate fuel for the commercial kitchen is shown by the fact that the most modern and successful hotels and restaurants are now using it.

W. J. ARMSTRONG *(Oakland):* A recent survey shows us that gas has about 70 per cent of the restaurant business, coal 20 per cent and oil ten per cent. There is no difficulty in getting the new business, but the big job comes in getting the old business to convert to gas. We can save them money and put them in a position to give better service to their patrons.

GEO. HIENAN *(San Francisco):* Oil competition is very strong in the bakery business on account of the relative cost. Recently Pacific Gas and Electric Company engineers have designed a very efficient bake oven and preliminary operating data lead us to believe that it will enable us to get more of this business.

INDUSTRIAL DATA SHEETS

I. L. HECKINGER *(San Francisco):* It has been suggested that it would be

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EDITORIAL

New Goals Ahead

IT is a little too early to cast up the final record achieved by the gas industry in the year which has just made way for 1927. But there is no ground for doubt that it was a banner year. The American Gas Association has given its opinion that gas sales for 1926 will show an eight per cent gain over the 421,400,000,000 cubic feet total of 1925, and the 1925 figure itself shattered all records.

Perhaps, beginning a new year it is more to the point to set goals for new advances, rather than to show undue pride in past attainments—for there is a wider field of conquest open to the gas industry in 1927 than ever before. In the hands of the commercial man and sales engineer have been placed some tools that will mean more effective selling in the year beginning. Gas refrigeration is here to conjure with; home incinerators are to be sold in a market to which they are comparatively new; with new rate structures coming into general use gas fuel is in a better position than ever before to take its rightful place in industry and to add to its load for house heating.

It would be possible to continue at length to name over the signs favorable to a progressive 1927—the list would be a long one. Already the American Gas Association's appliance testing laboratory at Cleveland, now about seventeen months old, is being accorded the confidence of the industry and the public. This year introduces the A. G. A. five-year program of research for the development of new industrial uses of gas, to which $500,000 is to be devoted. Gas associations, sectional and national, are already organizing their 1927 committees and shaping plans for a comprehensive program of work which will react to the individual good of every participating company and of the industry as a whole.

The end of the year will find the industry farther along on its mission of service to general industry and to the home. While there are some very real obstacles to be overcome—in competition, in the need for education of the public to the advantages of our product for old and new uses—these obstacles present nothing insurmountable. We know the path on which we are bound. A fuller appreciation of the possibilities inherent in gas is bound to come, as a matter of economics, and a show of initiative in 1927 will hasten its arrival.

Clarifying Rate-Making Issues

IN 1923 there was written into the laws of the State of New York a chapter prescribing a $1.00 gas rate and a 650 B.t.u. standard for gas utilities serving in that State. The gas-rate cases arising in New York City as a result of this legislation were carried to the United States Supreme Court by the Attorney General of the State of New York, and that high tribunal has at length handed down a decision which finds the New York enactment clearly confiscatory, and annuls and enjoins the rate and standard prescribed. These decisions are regarded as a fatal blow to attempts at political interference with company management in the State of New York, and their influence will be felt wherever precedent is summoned in defence of fair returns on invested capital.

Utility investors find further encouragement in the recent outcome of the suit brought by the Indianapolis Water Company against the Indiana Public Service Commission and the City of Indianapolis, which involved the bases of utility valuation, and in which the United States Supreme Court affirmed in unmistakable terms the right of utilities to adequate return upon the full present value of their tangible and intangible properties.

Where Radio Helps the Gas Business

A "BACK to the home" movement, it has been truly said, would benefit the gas industry as well as the morals of the nation. When the home is the center of the individual's activity it will be shown in an increased gas sendout for all domestic purposes. More meals eaten at home mean more gas burned for cooking. An old fashioned evening around the fire shows up on the monthly gas statement.

The gas industry does well to encourage any factors which strengthen the hold of the home upon family members. Certainly the radio is such a factor. In more than one way the radio industry has been a boon to the gas industry. It has added to industry's ranks another consumer dependent upon gas fuel—for its flexibility and controllability adapt it to a score of exacting needs of the radio manufacturer—and it adds to the hours spent under the home roof by the radio-owner.

Heating *the* Home---from Open Fire *to* Modern Gas Furnace

By J. A. MARTIN

This article, prepared for *Western Gas* by Mr. Martin, is a condensed form of the lecture presented by the author before a session of the Gas Appliance Association of Southern California school for gas appliance salesmen.

FIRE is one of man's chief problems, for it has to do with these essentials—health, comfort and warmth.

Primitive man built his fire on the floor of his cave or any other shelter he had the privilege of occupying. Fire was only necessary to cook his food and for a little warmth, but after he had learned to build his own crude hut the smoke became a grave objection. However, he observed that the smoke ascended and he therefore cut a hole in the roof to allow it to escape. You will find this provision made in the Indian wigwam of today.

But as man's dwelling passed from the crude to the plain and from the plain to the comfortable and even to the luxurious his heating problems became more complicated. He could no longer endure the smoke and he had not yet invented the chimney. Chimneys were not built to any great extent before the 13th century. However, some old records show that there was a scattering of them as early as 300 B. C. The Chinese cooley is believed to have used the first chimney.

The Chinese cooley constructed a two room mud hut for his dwelling. On one side of this hut he built a chimney. From the base of this chimney two ditches were constructed, which passed under the floors of each room and terminated in the open on the opposite side of the hut. Fires were built in these ditches and the draft in the chimney caused the fire to burn better, causing good combustion and also carrying off the smoke and gases. In doing so it heated the floors above the ditches which in turn heated the air in the above rooms. This was a great improvement over the open fire and we believe that this was the earliest attempt to harness fire. It was found that the draft in the chimney produced better combustion than was obtained in the open fire and the smoke had been carried off by the chimney, doing away with the smoke menace.

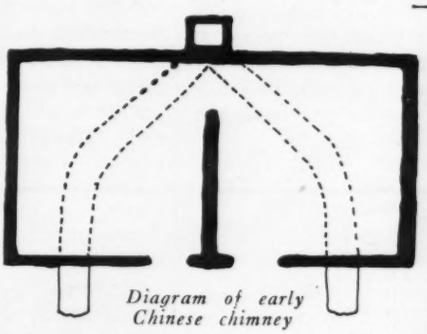
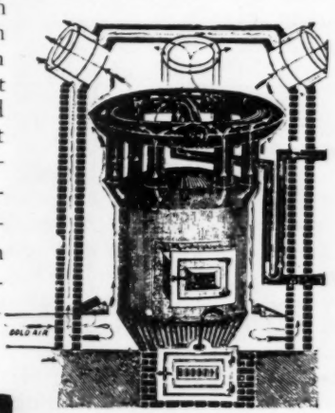


Diagram of early Chinese chimney

Now that the chimney had been invented, fireplaces were built in England, and the fireplace is one of the oldest methods of house heating which met with any degree of approval.

In looking over some of the old English cuts of great mansions no doubt you have noticed that a great many chimneys protruded through and extended high above the roof. Man had learned that height produced draft and that draft caused better combustion. These chimneys were of sufficient size that from four to twelve fireplaces could be connected to one flue. These were the methods our grandfathers employed to heat their homes, but soon these fireplaces went into discard because it was found that the air in the rooms was not heated by the radiant heat produced by the fireplace. It only parched the skin, irritated the throat and eyes and left the far corners of the room cold. When man discovered this fact he searched for better methods of heating.



Solid fuel furnace of period about 1850

His next step was to encase his fire in a metal container and now that the chimney had been produced the smoke and gases could be piped to the chimney, and so he set his heating stove out in the middle of the room where his friends and the entire family could sit around it and enjoy the heat.

It was not long, however, before this method was discarded in the better homes on account of the dirt and annoyance it caused, and man's search for better heating continued. It was found that the heat from his heating stove ascended straight to the ceiling. The next idea was to set his heating stove below the floors and pipe this heat into the various rooms, therefore having the stove and the dirt in the cellar.

In homes where fireplaces were already installed and this method put into the cellar, his heating apparatus worked very well because ventilation from the house could be had through the open fireplaces. This caused a circulation of air through the furnace and into the rooms, and the warm air coming into the rooms filled them from the ceiling to the floor line, expelling the cold air in the rooms through the fireplaces. This method worked so well that the fireplaces were soon discarded and then the heating apparatus refused to perform as it had done in the past, because of the lack of ventilation. It was some time before man found just what his troubles were, but when they were discovered he connected a cold air return pipe from the interior of his dwelling to the base of his furnace. He then discovered that his furnace worked better than it ever had because the cold air in the house was able to escape into the furnace, was heated and came back as warm air, and thus he produced a recirculation of the air in the house through the heater. With a system of this kind it does not matter what weather prevailes,—the winds can blow and the rains pour and the storms rage but still this system will always work, because the laws of nature have been complied with.

In the slow progress of civilization more effective heating arrangements are still to be adopted.

Stoves were gradually improved until they took the form of furnaces. As man studied air conditions he improved his heating systems and his troubles decreased. The first furnaces were built with restricted air spaces between the casing and the radiating surface, and then this was overdone by allowing too much air to pass between the radiating surface and the radiator. In the first case he found that a few pipes in the

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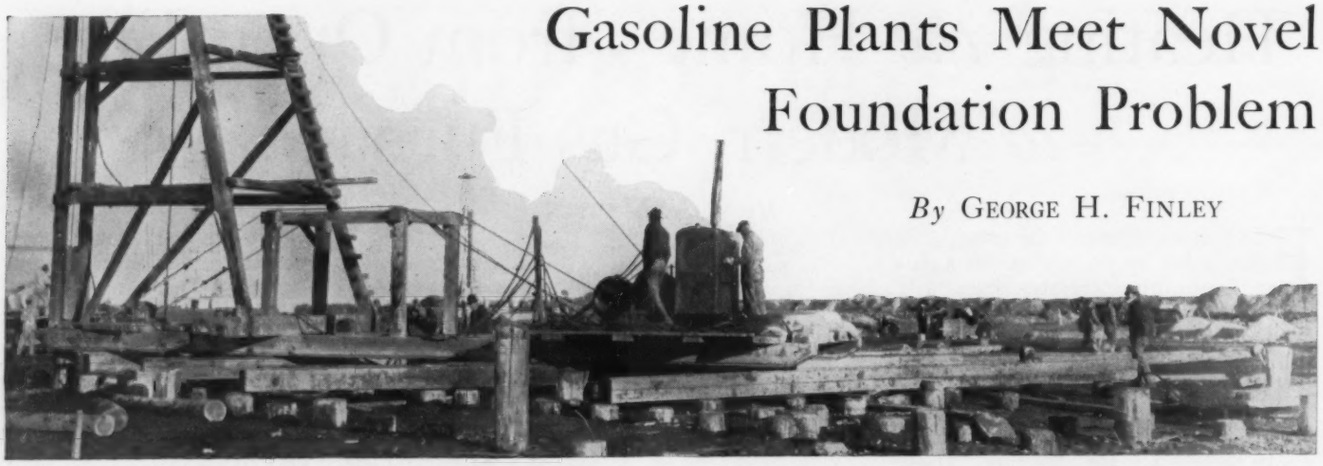
Gasoline Plants Meet Novel Foundation Problem

By GEORGE H. FINLEY

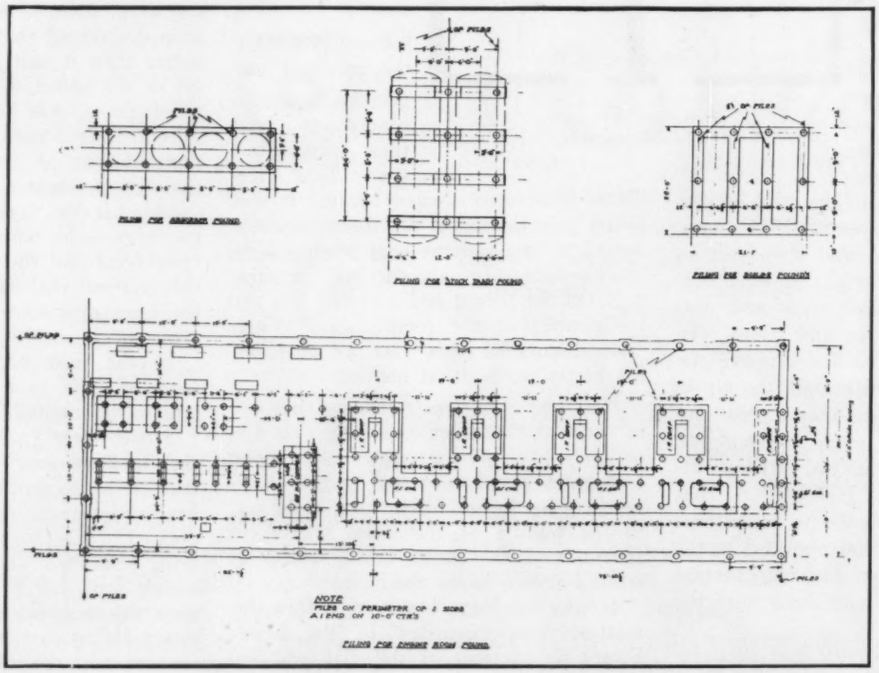


Above: Driving piling for foundation of Standard Gasoline Company's Seal Beach Plant, being built on marshy tidewater land.

NATURAL gasoline operators in California have no doubt encountered a wide variety of building problems, in putting up the scores of plants that have arisen in the path of oil field development. But nowhere, perhaps, have conditions been more unique than in the Seal Beach area where the Standard Gasoline Company and the natural gas and gasoline division of the Richfield Oil Company are both erecting permanent gasoline plants to treat the gas from the score or more of wells that are either now completed or going down. The Seal Beach field is too new to yield much present knowledge of what the settled gas conditions will be, or whether gasoline can be produced on a paying basis, but both companies are setting up plants that would do credit to an established field, and are building them in the face of ground conditions that present unusual difficulties. The water table at the Standard's location is but two feet below the ground surface, and at highest tide the plant site has been known to be under three feet of ocean.

The Standard Gasoline Company is building a plant about a half mile from the ocean front on Standard Oil Company property to handle gas from Standard Oil Company leases and others. This plant will have an initial capacity of 10,000 gallons, but by addition of more engine and compressor units, can be expanded to 30,000 on gas averaging one gallon to the thousand cubic feet. About 6,000,000 cubic feet of gas can be handled by the plant when it begins operation the latter part of January. Although gas tests vary rather widely to date it appears that the Seal Beach gasoline content will range from a gallon to a gallon and one-half to the thousand cubic feet.

At present the Richfield organization has three portable plants in operation, and is constructing a 20,000 gallon plant which will be treating gas early in January. It will operate on gas from the Marland Selover lease.



Showing arrangement of piles for foundation of engine room and compressors, absorber, stock tank, and boiler.

It is safe to say that no plant sites in the West have presented the same set of conditions that are to be found in Seal Beach, due to the marshy character of the land. Drilling operations have progressed under the same handicap, operators finding it advisable to build derricks on a foundation of piling, one of the larger companies using fifty-two piles to the derrick.

On the same page appears a reproduction of the ground plan for the Standard Gasoline Company's foundation structure of the Seal Beach plant, showing the arrangement of piling that has been adopted. Thirty-foot piling is being driven to a hard formation, the piles being not over eight inches in diameter on the small end and 14 on the large end. The plant site is 185 feet by 300 feet and around these limits at eight foot intervals will be a row of piling. A wall of redwood ties will be raised against this piling and a four foot dirt fill made, eventually, over the whole plant site. This fill will not be made at once, and piping can thus be laid on the present ground level, to be covered to a four-foot depth when the fill is made.

In the entire plant foundation, including foundations for absorbers, stock tank and boiler, there will be a total of about 200 piles. These

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Natural Gas *and* Natural Gasoline Conditions *at* Huntington Beach

Townsite Field Has Peculiarities; Gasoline Content *of* Gas *on* Decrease

By J. A. CAMPBELL *and* HENRY N. WADE

THE Huntington Beach Townsite oil field is already beginning to demonstrate once more the wastefulness of so-called "intensive" drilling —an object lesson which should have been learned long ago, particularly in Southern California. Here, in an area of about three-fourths of a square mile, are nearly 90 producing wells and 115 rigs drilling. A conservative drilling program, taking into consideration what is already known of the oil-producing zones, would call for possibly one-fourth, and certainly not over one-half, of the number of wells already producing and drilling.

The Townsite field appears to be underlain by at least five distinct productive zones, corresponding in a general way with the productive strata in the older parts of the field. Since the producing wells penetrate the oil horizons to various depths, and most of them are drawing from more than one zone, their characteristics from the standpoint of natural gas production are badly mixed. The situation is still further complicated by the fact that deepenings are matters of almost daily occurrence, and hence it is not possible to find any well which has been left alone long enough to establish any reliable production history.

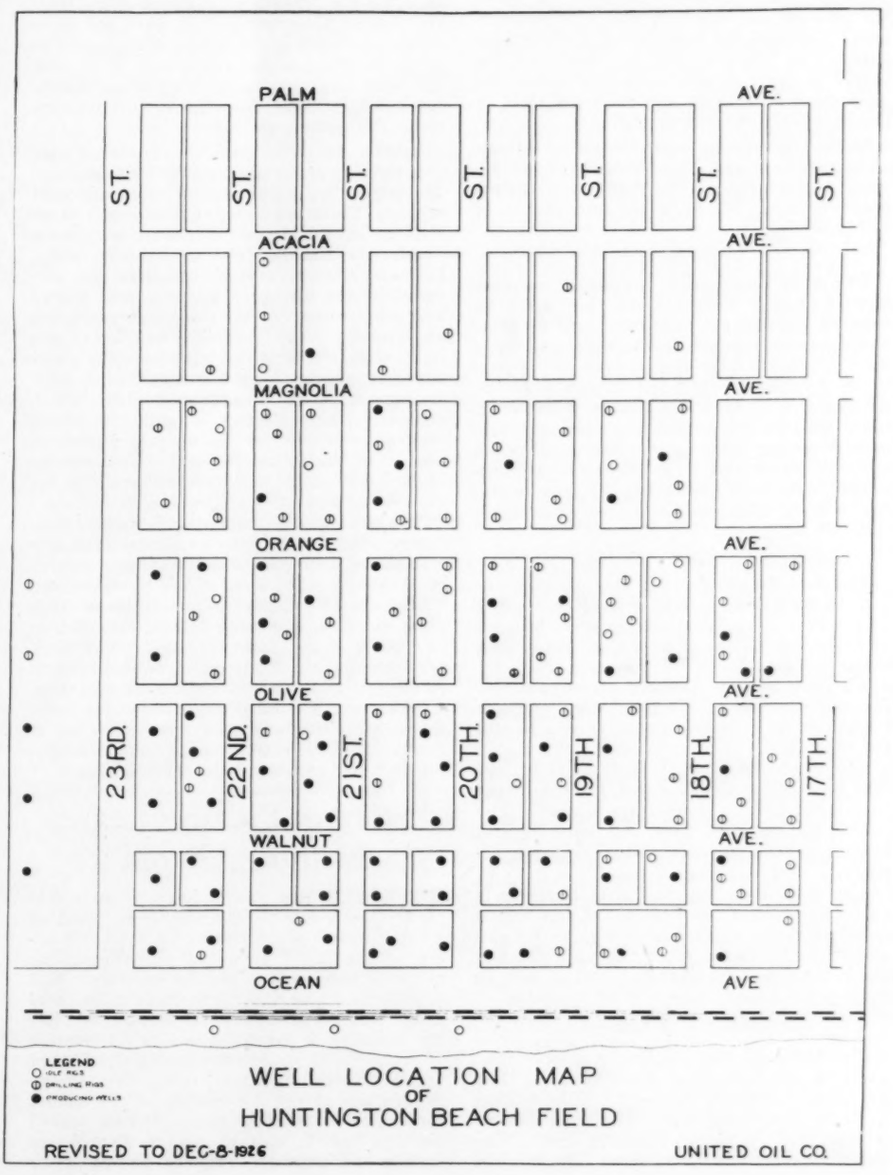
The following data were taken from the records of plant intake of one of the natural gasoline plants in the field, drawing gas from an average of 15 wells during the period covered.

Interval	*Ave. Daily Gas Prod. 1000Cu. Ft. Per Well*
Nov. 1 to Nov. 10	253
Nov. 10 to Nov. 20	256
Nov. 20 to Nov. 30	369
Dec. 1 to Dec. 10	462

Thus these wells showed an average increase in gas production of over 80 per cent during the month ending December 10, due partly to work done on some of them, and partly to an actual natural increase in the gas volume from some of the others.

The Townsite natural gas has shown one startling peculiarity which puts the new field by itself among local fields: that is, in many instances the natural gasoline content of the gas has decreased as the wells aged, instead of increasing as in practically all other fields. For example, one well came in September 25, producing gas which tested 4.36 gals. per 1000 cu. ft. by the pressure charcoal method. Three weeks later the content had dropped to 3.13 G.P.M., and then declined continuously to 1.60 on December 8. The specific gravity of the wet gas from the well declined from .944 to .80 in the same time. Another well showed a decline in gasoline content from 3.55 to 1.25 G.P.M. in the eight weeks ending December. Incidentally, it should be noted that all of these tests were made by the same men using exactly the same method, so that the possibility of errors in testing is eliminated. Many other cases have been observed which were similar to those given, but less pronounced. Several explanations have been advanced for this phenomenon,

(Continued on Page 48)



Natural Gas *in* Alberta

By S. E. SLIPPER

Geologist, The Canadian Western Natural Gas, Light, Heat and Power Company Calgary, Alberta

Following is an excerpt from an address given on the above topic by Mr. Slipper during the second annual convention of the Montana Chapter, Rocky Mountain Oil and Gas Association, which was held at Great Falls, Montana, from December 1 to 3, inclusive.

THE utilization of natural gas has attained its greatest development in the United States and Canada. The United States is first in the world's production while Canada stands second. But the United States' production in 1924 had reached the enormous figure of one thousand billion cubic feet valued at 254 million dollars; while the Canadian production was only one sixty-third of this, valued at 16 million dollars. (I should acknowledge that the statistics I am using have been taken from U. S. and Canadian Government reports.)

Prior to 1924 the supremacy in natural gas production was held by the Eastern states but in 1924, the Western and Southwestern states acquired the lead in the volume produced. In Canada, Ontario produced the larger volume of gas until 1925 when the production in Alberta exceeded the Ontario production by two billion feet.

In 1925, according to the Dominion Bureau of statistics, Ontario produced 7,143,962 M. cubic feet valued at $3,958,006.00. Alberta produced 9,119,500 M. cubic feet valued at $2,752,545.00.

HISTORICAL

The serious utilization of natural gas commenced in the United States in 1824. In Eastern Canada gas was first used in 1857. In Western Canada a few shallow gas wells were drilled along the main line of the C. P. R. prior to 1903 but in that year the Medicine Hat Gas Field was discovered. Since then there has been a continual development of gas fields in the Province. Some of these discoveries were made by gas companies definitely exploring for gas while others were found in the course of exploration for oil.

FUTURE GAS SUPPLIES

The possible gas bearing area of the province is very large. A very large part of it is however of only casual interest because of being too distant from the gas consuming centers—Calgary and Edmonton.

The possible gas bearing areas available for the service of Calgary and southern towns are the southern plains of Alberta and the foothills.

Recent geological work leads us to believe that the southern plains will yield us large supplies of gas for many years to come. The future gas supplies from the foothills will largely depend upon the oil exploration activity.

The Edmonton supplies will continue to be obtained from this central Alberta region —the northern areas containing the Pelican and Peace River fields are too far away and too isolated to be considered and it will be some years before they will be valuable.

DEVELOPMENT OF THE FIELDS

The Medicine Hat gas field was developed early in the history of the Province. The gas field underlies the city. The drilling depth is about 1000 feet. The open flow of a new well is about 3,000,000 feet. The closed pressure is now about 350 pounds. The gas is produced and distributed as a municipal enterprise. The drop in pressure has been about 10 per cent.

The Bow Island field was developed by the Canadian Western Natural Gas Heat and Power Company to supply Calgary. Production began in 1912. The depth to the gas sand is about 2000 feet. The original open flow of the wells was from 8,000.000 to 24,000,000 cubic feet and the original rock pressure 750 pounds. The field took all the Calgary load from 1912 to 1923. It is now used mostly as a standby field.

The Foremost field was discovered by the United Oil Company in 1916. It was developed by the Canadian Western Gas, Heat and Power Company. It is now our main source of supply in the southern plains. The depth to the gas sand is about 2100 feet. The open flows are from 7,000,000 to 20,000,-000 cubic feet per day—the closed pressure about 700 pounds per square inch.

All the gas received from Turner Valley is purchased from the Royalite Oil Company. Turner Valley at present is our source of supply. There are two gas lines into Turner Valley. A 6-inch line is connected with a compressor station and absorption plant. Formerly the low pressure gasoline gas produced by the Royalite Company was stuffed and compressed into the company's main line at Okotoks. The ten-inch line was constructed to transmit the high pressure gasoline gas produced by Royalite No. 4 well. It connects with a scrubbing plant which eliminates the sulphur odor and with Smith separators where the gasoline is condensed and from thence to the well. The volume of No. 4 Royalite is 20,000,000 feet and the rock is not known.

The Viking field supplying Edmonton was discovered by a company proposing to supply Edmonton with gas. The development was consequently taken over by the Northwestern Utilities. The depth to gas is about 2100 feet; the open flow ranges from 7,000,000 to 12,000,000 cubic feet per day. The rock pressure is about 700 pounds per square inch. Edmonton is served through a 12-inch line.

There are a number of shallow gas wells in the province which in some cases as at Brooks and Witaskwin supply sufficient gas for the few consumers in the community.

"Story *in* Pictures Leaves Nothing Untold"

WHILE the gas industry's story has been told to the public by word of mouth and in print in a wide variety of media, it is to be noted that one phase of the industry can be effectively told in pictures. The film, "The Story of Natural Gas," was prepared several years ago under the direction of the Natural Gas Association of America, in co-operation with the United States Bureau of Mines, being first shown to members of the Association at the annual convention of 1922. It has since been turned over to the Bureau of Mines Experiment Station at Pittsburgh, Pa., and any responsible party may secure it free of charge for showing, simply by making request of the Bureau at the address given.

Beginning the story with the first survey of location, the film carries through to the final arrival of the gas in the home of the user. Scenes were nearly all laid in West Virginia.

Guy F. Batchelor, general secretary of the Natural Gas Association of America, gives us the following outline of the film's scenario in a recent letter to *Western Gas:*

Engineering surveying for location.

Driving stakes for well.

Hauling in the material—reels, cables, etc., by teams of horses, yoke of oxen, and tractors.

The building of a derrick, both of steel and wood, and the amount of lumber needed therefor.

Hook-up of tools and engine.

Bringing up of stem through the rigging.

"Spudding in."

Drilling operations.

Losing of tools and fishing operations.

Glycerine cart—shooting the well.

Spray of two or three hundred feet in the air of smoke, rock, etc.

Connecting of well into the line and starting of the gas.

Inspecting the pipe lines; making rock pressure gauges.

Compressing stations—a wonderful piece of photography.

Tractors in use in the West Virginia mud. Two or three tractors and eight or ten teams hauling machinery over the West Virginia roads.

Erection of station. Diagrammatic drawing of bottom of well.

Journey of gas from sand into tubing and casing.

Following the gas through the pipe lines, compressing stations, main line regulators and city distribution plants into the home.

Arrival of the gas in the kitchen of the home, and lighting of the fire by the maid.

SOUTHWEST DIVISION OF THE NATURAL GAS ASSN. TO MEET

The first meeting of the Southwest Division of the Natural Gas Association of America will be held in Tulsa, January 11. This meeting was determined upon by Vice-President McGowen, H. L. Montgomery and H. C. Morris, the committee designated by the Association to form the Southwest Division, joined by several members of the Directorate of the Association.

The meeting will consider the various activities of the Division and plan for such further program of work as may be expected to increase the value of the Association to the industry.

Every person in the Southwest who is interested in the production or distribution of natural gas should attend this meeting. It is a movement to make the Association so useful to the industry in the Southwest that its membership will embrace practically every person in this region who is eligible.

SHORT COURSES FOR METERMEN IN MID-WEST DISTRICT

Gas men from five states in the Mid-West, Iowa, Nebraska, Minnesota, and the Dakotas, which make up the Mid-West District Gas Association, were offered the sixth annual short course for metermen, conducted at Ames, Iowa, under the auspices of the Association and the engineering department of the Iowa State College extension division.

New House Heating Rates *in* Boulder, Colorado

PERMISSION to include a schedule of house heating rates for artificial gas customers in the City of Boulder, Colorado, was granted by the local City Council on November 16, and the schedule of rates became effective on December 1. The petition to add the house heating rate schedule to the present Boulder gas rates was presented to the Council by Manager Frank S. Henderson of the Public Service Company of Colorado, which operates both the electric and gas utilities in the City of Boulder. The new rate was designed to take care of an off peak condition which has been occasioned during the winter season throughout recent years. It is based on the Doherty three-part method and is available to customers using larger quantities of gas for both house heating and domestic purposes. The rate is as follows:

RATE (three charges)

Commodity Charge

First 100 hours use of maximum demand, per M. cu. ft. ..... $ .50

All additional use of gas, per M. cu. ft. ..... .35

Plus a

Reserved Capacity Charge

Per cu. ft. of maximum hourly demand, per annum ..... $ .21

payable as follows: For ordinary domestic uses, in 12 equal monthly installments; for additional capacity account of house heating, in 8 equal monthly installments during the period of October to May inclusive.

Customer Charge

Per annum, payable in 12 monthly installments $12.00

DETERMINATION OF RESERVED CAPACITY

Reserved capacity shall be taken as that specified in service application and Company is hereby authorized to install a demand limiting device to supply said demand. For domestic uses demand may be estimated by Company.

Minimum

Net minimum charge equivalent to fixed portion of the rate but not less per month, per customer than $ 3.00

Discount

The above rates are net. To all bills not paid within ten (10) days from date due, there will be added 10 per cent of the net bill.

Several applications for house heating installation have already been received, although it was not expected that any large number of customers would be added immediately under this schedule. Boulder is a city of sixteen thousand population, thirty miles north of Denver and fifty miles south of Fort Collins. In the latter city, the Public Service Company supplies natural gas for house heating and domestic uses.

DUFOUR SUCCEEDS VAUGHN WITH CALIF. COMMISSION

The Railroad Commission has appointed P. E. Dufour as valuation engineer, effective January 1, 1927, to succeed R. M. Vaughn, who recently resigned from the service of the Commission.

Mr. Dufour has been with the transportation division of the Commission's engineering department since March, 1921, at which time he was employed to make an extensive check of the Federal valuation of the steam railroads in California. He has handled the valuation work on several of the large investigations made by the Commission's engineering department.

A descriptive display of dinner ware in the windows of the Southern California Gas Company

Gas *in the* Manufacture *of* Dinner Ware

By E. M. DE REMER

Sales Engineer, Southern California Gas Company

SOUTHERN California boasts of many industries, attracted here by our climatic conditions, transportation facilities and natural resources. Efficient, dependable fuel has a great deal to do with the fact that there are now located in Southern California three companies devoted to the manufacture of semi-porcelain dinnerware and these are the only such companies west of the Mississippi.

The Poxon Pottery Company of Los Angeles has been established for 14 years and in the last seven years has not experienced a shutdown, except for a two week vacation period during each year. Then there is the Empire China Company, located in Burbank, which has been operating steadily for the last four years since its establishment, in a very modern and efficient plant. The Mission China Company, also located in Los Angeles, has been established about four years, and in that time has built up a thriving business.

The Poxon Pottery Company, established in 1912, is headed by George Poxon, who came to Los Angeles from England two years before he set up his plant here, and who previous to coming to America had most thoroughly learned the art of moulding and burning semi-porcelain ware in the English pottery fields. The plant at the present time has five bisque and gloss kilns and two decorative kilns. All English clay is used in the manufacture of the dinner ware. The necessary silica and feldspar are obtained in Arizona and Nevada. The plant contains grinders for pulverizing its silica and feldspar—something only a few plants do.

The process of producing dinner ware very briefly is as follows:

A batch of ball clay, china clay, silica and feldspar is mixed thoroughly to the right consistency. This clay is then formed by moulding on the potter's wheel or by forming in plaster of paris moulds to the desired shapes. The moulded clay is then dried naturally or in gas-fired driers. The ware is then baked or burned at a high temperature in large gas-fired bisque or gloss kilns. It is then dipped in glaze solution, allowed to dry and again burned in the bisque or gloss kiln. The ware is now glossy and may be used as undecorated ware. Usually it is decorated. This is done by applying the decoration and again firing, this time in a large gas-fired decorative kiln. The ware is fired in the decorative kiln once or a number of times, depending on the color scheme and extent of decoration. Each time the ware is burned in the bisque or gloss kilns, it is stacked on supports in Seagers or protective coverings to aid in handling and even distribution of heat.

The Poxon Pottery Company now manufactures both hotel ware and dinner ware in this plant, and increased business has necessitated the construction of an additional plant located near the old one, where five kilns will be constructed for the exclusive manufacture of hotel ware.

Industries of this type are dependent on an adequate supply of a fuel which will give a high combustion efficiency and is readily adaptable to automatic control. Southern California is fortunate in having as one of the factors that is vital to the industries the resource of natural gas which, as it is now properly conserved and distributed, will supply the heat and power needs for many years to come.

A CASE WHERE NATURAL GAS IS NOT AN ASSET

JOHN T. CLARK of Denver, Colo., president of the Midwest Refining Company, was present at the December meeting of the Montana Chapter of the Rocky Mountain Oil and Gas Association, and took occasion to point out one large field that is open to the gas man's inventive genius—that of turning natural gas into an asset when it is found too far from population centers to make its transportation thither profitable.

Said Mr. Clark: "Convention after convention, committee meetings after committee meetings, I have listened anxiously for some gas man to tell us out in this country where we have more gas than oil, what we can do with gas, and make money out of it.

"We have all kinds of gas fields from Texas to the Canadian border; there are very few of them utilized. We have wells that have forty million feet that are nothing but an expense in territories where we cannot utilize the gas.

"I have a feeling, and have had it for years, that the solution of that problem, when it comes, will be so simple that all of us will kick ourselves, as we always do, when we have failed to solve some of the problems that somebody else comes along and solves, but I once again leave one of these meetings, without any idea how we can make use of this wonderful resource, which costs us money, when we get it, and which we do not conserve to some future day when somebody else will make use of it."

NEW EQUIPMENT AT PLATTSMOUTH, NEB., PLANT

An auxiliary cooling tank has been installed at the gas plant of the Nebraska Gas & Electric Company at Plattsmouth, Neb., at a cost of $10,000.

SOUTHERN TEXAS USE OF GAS IS ON INCREASE

The Houston Pipeline Company is now delivering an average of 70,000,000 cubic feet of natural gas a day from wells in Refugio, Live Oak and Webb counties. Deliveries have at times reached 82,000,000 cubic feet a day.

Deliveries are to large industries including the Texas Gulf Sulphur Company and the Freeport Sulphur Company, the Sugarland industries, the Galena Signal Oil Company refineries, Humble Oil and Refining Company and many industries in the vicinity of Houston, especially on the ship channel.

A large compressor station is now being built by this company at Edna which will add to its capacity to supply industrial gas. The company has more than 475 miles of main and branch lines.

The Houston-Gulf Natural Gas Company which supplies gas to the Houston Gas and Fuel Company, that serves the people of Houston, also has a very large demand for industrial gas in the vicinity of Houston. This company and the Houston Pipeline Company are delivering approximately 100,000,000 feet of natural gas a day to domestic and industrial consumers in the vicinity of Houston and in that city.

Then there is the Magnolia Gas Company that is delivering natural gas from the fields of Northeast Texas to the extent of 40,000,000 cubic feet a day to the Magnolia Petroleum Company's refinery at Beaumont and to the Southwestern Gas and Electric Company in that city for domestic use.

MONTANA-DAKOTA POWER CO. TO DEVELOP GAS RESOURCES

The Montana-Dakota Power Company, a corporation capitalized at two million dollars and in operation in western North Dakota and eastern Montana for the past two years, has extensive plans for the development of natural gas resources in this vicinity during the coming year. Gas from the fields at Baker, Montana, already serving Glendive, is to be brought north through the communities of Stipel, Intake, Burns, Savage, Crane, Sidney, Fairview, and Snowden, Montana, and through Trenton, N. D., to Williston, about 155 miles from the Baker gas fields. The project will be completed in about a year, and every town named will have gas for domestic use, according to present plans.

CARBON BLACK PLANT

Gas supplies for the new carbon black plant of the Crystal Carbon Company now building just west of the Colorado line in eastern Utah, are rapidly materializing. A recent gas well brought in on the Cisco dome by the company had a flow of eight million cubic feet a day. The original Cisco gasser had a 90 million feet flow.

GAS SERVICE IN FRANKLIN COUNTY, IDAHO

A fifty-year franchise has been granted H. H. Merril and others to operate a natural gas heating and lighting system, and lay the necessary lines, in the county of Franklin, Idaho. Gas prospects near Preston, Idaho, are thought to be favorable to development.

BYLLESBY ENGINEERS PLAN JANUARY CONVENTION

The annual convention of the engineering department of Byllesby Engineering and Management Corporation is scheduled for January 25-27, inclusive, to be held in the company's Chicago office.

Walter M. Berry Now *in* Gas Consulting Work

WALTER M. BERRY, executive engineer for the California Gas Research Council for the past three years, and formerly Gas Engineer for the Bureau of Standards at Washington, D. C., has announced that he is entering the consulting field, beginning January 1, 1927, specializing on gas utilization problems.

Walter M. Berry

Mr. Berry's unique experience has well qualified him in this line of work, for during the seven years that he was with the Bureau of Standards he worked on the national gas safety code, made investigations of gas service conditions in numerous cities, and also directed the laboratory work of the Bureau on gas appliances, which resulted in such publications as Technologic Papers 193, 222, and others widely used by the gas men.

Mr. Berry was a member of the committee that investigated the gas asphyxiations in Baltimore, Md., and he worked with the authorities in drafting the Baltimore gas ordinance. He was a member of the mayor's committee that investigated the accidents occurring in Los Angeles during the winter of 1924-25.

During Mr. Berry's association with the California Gas Research Council, the technical papers submitted through that organization have formed an important part of the programs of the Pacific Coast Gas Association. He directed the successful school for appliance men conducted by the University of California last winter.

As consulting engineer for the Gas Furnace Association of Southern California, Mr. Berry will give a good deal of attention to house-heating problems and gas-furnace specifications, and he is also prepared to handle a wide variety of problems relating to the gas industry, such as design of domestic and industrial gas appliances and their testing for safety, efficiency, and capacity; editing of technical papers; cost accounting; securing of patents; and miscellaneous technical service relating to engineering and chemistry.

Mr. Berry will be located in Room 826, 810 South Flower Street, Los Angeles. While making Los Angeles his headquarters, his services will be available to manufacturers in the San Francisco bay district.

COMBINED EMPLOYEE POLICY SECURED IN SEATTLE

The Puget Sound Power and Light Company, Seattle, Wash., has arranged with the Western Union Life Insurance Company to offer a combined life insurance, disability insurance, and insured pensions policy to employees of the company. About 3,600 employees are involved and it is estimated that some 60 per cent of this number will enter into the plan. It is thought that the total group policy will amount to $5,400,000.

COOPER COMPANY FOLDER

"Distribution of Manufactured Gas" is the title of a folder newly prepared by the C. & G. Cooper Company, Mount Vernon, Ohio.

GAS HEATING DISCUSSED AT SAN DIEGO MEETING

Forty-eight prominent San Diego architects, plumbers and building contractors met on December 22nd as guests of the San Diego Consolidated Gas & Electric Company, to engage in a general discussion of heating engineering and gas heating in particular.

H. W. Elder, gas appliance expert of the local company, was the first speaker. He emphasized the fact that gas heating was both healthful, reasonable and comfortable, providing the heating appliance was of an approved type and properly installed. Mr. Elder told his audience that there is absolutely no danger from heating or cooking with gas, if the appliance is efficient and the room properly ventilated. In closing he stated that in gas appliances, as in any other commodity, you get just what you pay for.

The next speaker, W. L. Hoyt, Pacific Coast sales manager for the American Gas Products Corporation, told of the ever-increasing use of gas generated steam equipment for heating large residences and office buildings. It was his opinion that a heating system should compare in value with the rest of the house, and that an inefficient system detracts from the whole, just as a weak link in a chain.

P. J. Daugherty, heating engineer of the Hoffman Specialty company, the final speaker, stated that today there is no guesswork in heating engineering. He concluded with a detailed explanation of the Hoffman steam distribution and heating system.

LARGEST METER SET UP ON LINES OF L. A. G. & E.

Los Angeles Gas and Electric Corporation recently installed its largest meter set-up for the new Ralphs Grocery Company's store at Seventh Avenue and Washington Boulevard. Baking equipment of this firm consists of 16 Dutch-type ovens, intermittently fired, each with a baking capacity of 400 loaves of bread per hour. The connected gas load is something in excess of 20,000 cubic feet per hour. The company installed a bank of eight 25C meters of a new low pressure type, the diaphragms being of double bellows construction.

DATES FOR SAFETY MEET ARE SEPTEMBER 26-30

The 16th annual convention of the National Safety Congress will be held at the Stevens Hotel in Chicago, September 26-30, inclusive, this year, announces D. W. Cameron, managing director of the National Safety Council. About 5,000 people attended the 1926 convention, held last December, and the 1927 meet is expected to draw at least 6,000 persons interested in accident prevention.

$1.000,000 ISSUE PERMIT FOR PACIFIC GAS & ELECTRIC

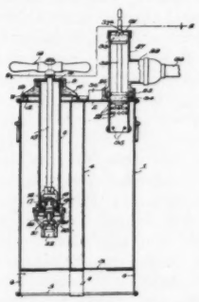
Pacific Gas & Electric Company has been authorized by the Railroad Commission to issue and sell at not less than par, $1,000,000 of six per cent cumulative preferred stock, and $1,000,000 of common stock, and to use the proceeds derived from the sale thereof for additions and betterments.

GAS GAINING 400,000 NEW USERS EACH YEAR

The gas business throughout the nation is adding new customers at the rate of 400,000 a year. At the present time there are in use in the United States 9,800,000 gas stoves, 3,400,000 gas water heaters and 4,400,000 gas space heaters.

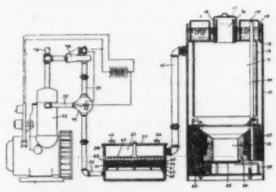
THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,604,385. DEVICE FOR CLEANING GAS SERVICE PIPES. Ernest L. Bullock and Elmer S. Umstead, Providence, R. I. Filed Nov. 16, 1925. Serial No. 69,549. 8 Claims. (Cl. 137—70.)



2. In a gas service cleaner device, a tank, means to exhaust air from the tank, a valve cylinder communicating with the tank, means to connect a conduit to the cylinder, and valve mechanism in the cylinder which in one position closes communication between the cylinder and conduit and which upon release is automatically moved by the vacuum to establish such communication.

1,608,678. METHOD AND APPARATUS FOR PURIFYING GAS. Harry F. Smith, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio, a Corporation of Ohio. Filed Sept. 30, 1921. Serial No. 504,289. 15 Claims. (Cl. 183—48.)



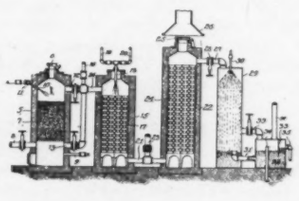
1. The method of removing from producer gas or the like the impurities which normally exist therein as discrete particles of solid and liquid character, which consists in first applying upon a sustaining fabric a layer of purifying material in which the dimensions of the particles of material are of the same order of magnitude as the particles of material being removed and then passing the impurity-laden gas through a continuously maintained layer of such finely divided material supported upon such sustaining fabric.

2. Purifying apparatus of the character described for removing from producer gas or the like the impurities which normally exist therein as discrete particles of solid and liquid character, which comprises a housing having an inlet for the impurity-laden gas and an outlet for the clean gas, a layer of fabric within said housing and interposed between the said inlet and outlet, and a continuously maintained layer of finely divided material upon said fabric to constitute a purifying layer, said material being composed of particles the dimensions of which are of the same order of magnitude as the particles of impurity to be removed from the gas.

1,609,097. PROCESS OF MAKING CHARCOAL BRIQUETTES AND PRODUCT DERIVED THEREFROM. Orin F. Stafford, Eugene, Oreg. Filed July 15, 1922 Serial No. 575,323. 7 Claims. (Cl. 44—10.)

1. A process of making charcoal briquettes which comprises incorporating comminuted charcoal, tar material, starch and water, in such proportions as to produce a plastic mass, molding the same and drying the product.

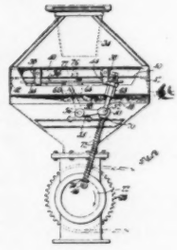
1,609,023. METHOD OF JOINTLY MANUFACTURING CARBURETED WATER GAS AND VOLATILE HYDROCARBON MOTOR FUELS. Frank A. Howard, Elizabeth, N. J., assignor to Standard Development Company, a Corporation of Delaware. Filed Mar. 24, 1921. Serial No. 455,200 1 Claim. (Cl 48—205.)



The method of jointly manufacturing carbureted water gas and volatile hydrocarbon motor fuel which consists in air blasting a bed of carbonaceous fuel to incandescence, passing the heated blast gases as produced over heat absorbent material, to heat the same to a temperature between 850° F. and 1050° F., steam blasting the incandescent bed to produce water gas, passing the heated water gas over the said heated material, injecting into the current of heated water gas a heavy hydrocarbon oil and thereby causing the oil in vaporized form to pass with the water gas over the said heated material, controlling the rate of flow of the mixed water gas and oil vapors, with reference to the temperature of the said heated material, so as to secure a production of fixed hydrocarbon gas not less than 15% nor more than 60% of the weight of oil injected, cooling the mixed gases and vapors to cause condensation of the vaporous portion, thereof, separating the condensed oil including volatile hydrocarbon motor fuel from the fixed gases, and controlling the amount of injected oil so that the said fixed gases shall have an average B. t. u. value of not less than 450 nor more than 650 per cubic foot.

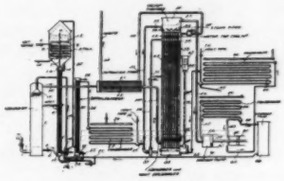
1,604,229. FEEDER FOR GAS GENERATORS. George W. Saathoff, South Orange, N. J., assignor, by mesne assignments, to Combustion Utilities Corporation, New York, N. Y., a Corporation of Maine. Filed Jan. 14, 1925. Serial No. 2,398. 3 Claims. (Cl. 214—35.)

1. A fuel feeding apparatus comprising in combination a hollow rotary feeder having a mouth for entrance and exit of fuel, a horizontal plate mounted for reciprocation above said feeder, a spout above said plate for delivering fuel thereto, a connection between said feeder and said plate whereby the plate is moved forth and back during



definite portions of a given revolution of said feeder, and means for causing positive lateral movement of the fuel supported by the plate relative to the surface of the plate as the plate moves back and forth.

1,607,942. APPARATUS FOR THE ABSTRACTION OF GASOLINE. Charles Henry Brown, Breckenridge, Tex. Filed Dec. 5, 1923. Serial No. 678,690. 5 Claims. (Cl. 196—8.)

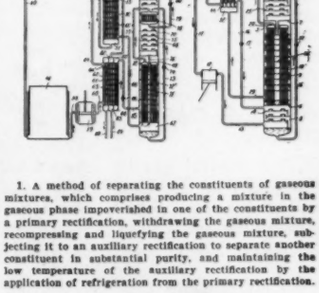


1. An apparatus of the class described, comprising in combination, means supplied with a quantity of absorber oil which is in excess of the quantity required to absorb the lower Baumé gravity gasoline for causing absorption of the lower Baumé gravity gasoline, means for supplying the first mentioned means with gasoline-laden gas, a still for separating said gasoline from the absorber oil, a heat exchanger connected with the first mentioned means for receiving the gas carrying only the higher Baumé gravity gasoline for cooling said gas, a second absorber tank connected with the heat exchanger, means for introducing absorber oil into the top of the tank, and means connecting the heat exchanger with the body of the tank whereby the higher Baumé gravity gasoline laden gas is charged into the bottom of said tank whereby the gas flows upward through the down stream of the absorber oil, a plurality of tubes located in the tank, chambers at the top and bottom of the tank and connected by the tubes but out of communication with the body of the tank, means connecting the space in the tank around the tubes with the lower chamber whereby the absorber oil charged with higher Baumé gravity gasoline is permitted to enter the tubes whereby the heat caused by the absorber oil absorbing the higher Baumé gravity gasoline is imparted to the tubes and to the absorber oil charged with higher Baumé gravity gasoline passing through said tubes, and means for maintaining a lower pressure in said tubes and chambers than in the tank space around said tubes.

1,604,565. PURIFICATION OF GASES. Sylvain Coulier, Brussels, Belgium. Filed Oct. 16, 1925, Serial No. 62,874, and in Belgium Oct. 18, 1924. 23 Claims. (Cl. 23—76.)

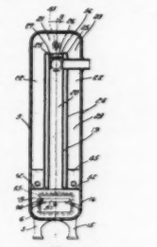
1. In a process for removing sulphuretted hydrogen, hydrocyanic acid and other constituents of the kind, from gases in which the constituents are absorbed by an alkaline solution which is placed in the presence of a compound of iron capable of fixing the sulphur in the state of iron sulphide,—the steps comprising separating the iron sulphide, treating the resulting solution containing alkali metal ferrocyanide with a compound of iron in the presence of carbon dioxide, and separating the precipitated ferrocyanide of iron.

1,607,708. SEPARATION OF THE CONSTITUENTS OF GASEOUS MIXTURES. Claude C. Van Nuys, Cranford, N. J., assignor to Air Reduction Company, Incorporated, New York, N. Y., a Corporation of New York. Filed Oct. 22, 1924. Serial No. 745,100. 12 Claims. (Cl. 183—115.)



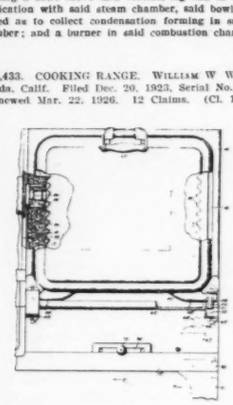
1. A method of separating the constituents of gaseous mixtures, which comprises producing a mixture in the gaseous phase impoverished in one of the constituents by a primary rectification, withdrawing the gaseous mixture, recompressing and liquefying the gaseous mixture, subjecting it to an auxiliary rectification to separate another constituent in substantial purity, and maintaining the low temperature of the auxiliary rectification by the application of refrigeration from the primary rectification.

1,607,838. GAS STEAM RADIATOR. Earl G. Matthews, Los Angeles, Calif. Filed Oct. 23, 1923. Serial No. 670,258. 4 Claims (Cl. 237—17.)



3. In a heating device, the combination of a hollow structure forming a combustion chamber; a vertical leg extending upwardly from said combustion chamber; walls forming a steam chamber extending vertically upward adjacent to said vertical leg and across the top thereof, the lower portion of said steam space forming a receptacle for water directly over said combustion space, walls forming a bowl above said vertical leg and in open communication with said steam chamber, said bowl being so placed as to collect condensation forming in said steam chamber; and a burner in said combustion chamber.

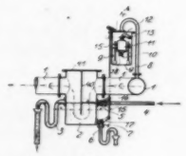
1,604,433. COOKING RANGE. William W Weir, Alameda, Calif. Filed Dec. 20, 1923, Serial No. 681,798. Renewed Mar. 22, 1926. 12 Claims. (Cl. 126—39.)



1. In a cooking range, a supporting base, an oven supported on top of the base at one side thereof, a burner support at the other side of the base, and a back plate supported on the burner support at the back edge of this support, said burner support having its back and one of its side edges substantially identical in form whereby either of these two edges may fall at the back of the range to support the back plate, depending on which side the oven is located.

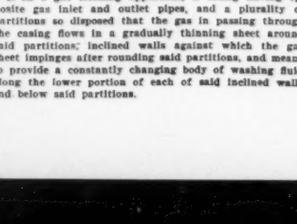
1,609,525. SAFETY GAS TRAP. Erich Moldenhauer, Dusseldorf, Germany. Filed Feb. 26, 1924, Serial No. 695,267, and in Germany Apr 14, 1920. 6 Claims. (Cl. 67—115.)

4. In a safety gas trap of the character set forth, in combination with a pressure gas main, a trap interposed in said main, water inlet and outlet means for the trap, a gas pressure responsive device communicating with said pressure main, and means operable by said



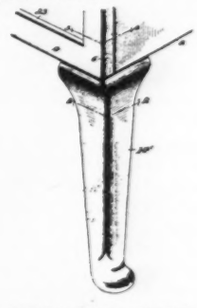
pressure responsive device and governing said water inlet and outlet means for controlling the water level in said trap.

1,609,611. GAS CLEANER. James F. Dovel, Birmingham, Ala. Filed May 7, 1921. Serial No. 467,679. 4 Claims. (Cl. 261—111.)



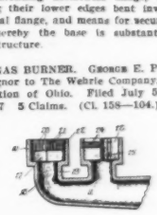
3. In a gas cleaning apparatus, a casing having opposite gas inlet and outlet pipes, and a plurality of partitions so disposed that the gas in passing through the casing flows in a gradually thinning sheet around said partitions, inclined walls against which the gas sheet impinges after rounding said partitions, and means to provide a constantly changing body of washing fluid along the lower portion of each of said inclined walls and below said partitions.

1,609,204. CONCEALED BASE FOR GAS RANGES. Joseph Roy, Cleveland, Ohio, assignor to American Stove Company, St. Louis, Mo., a Corporation of New Jersey. Filed June 30, 1926. Serial No. 119,662. 15 Claims. (Cl. 126—39.)



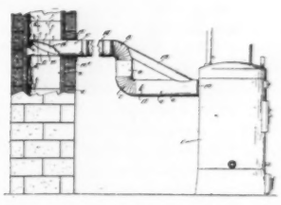
1. In a range construction, a base plate having an outwardly extending horizontal flange, side and front walls having their lower edges bent inward to fit the said horizontal flange, and means for securing the flanges together, whereby the base is substantially concealed within the structure.

1,604,783. GAS BURNER. George E. Pickup, Newark, Ohio, assignor to The Wehrle Company, Newark, Ohio, a Corporation of Ohio. Filed July 5, 1924. Serial No. 724,237 5 Claims. (Cl. 158—104.)



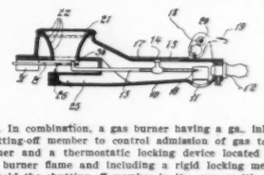
1. A gas burner comprising, in combination, a manifold having a plurality of burner heads cast integral therewith and a plurality of jet plates within each head arranged in uniformly spaced relation, said plates being made of a material different from the metal of the head and having their opposite ends permanently embedded in the heads.

1,608,630. DRAFT APPLIANCE FOR FURNACES. Frank B. Snyder, Lancaster, Pa., assignor of forty-nine per cent to John H. Halles and of fifty-one per cent to R. L. Peterman, both of Lancaster, Pa. Filed June 3, 1926. Serial No. 113,496. 7 Claims. (Cl. 126—285.)



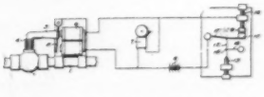
4. In a draft appliance for furnaces, a hollow body member for delivering the products of combustion from a furnace to a chimney having a baffle extending beyond its discharge end to obstruct back draft from the chimney, and a vane supported beneath the said baffle and extending from the outer end of the baffle to the said end of the body at the lower side thereof and providing means for causing division of the products of combustion as they are deflected by the baffle.

1,609,838. GAS BURNER. Ferdinand Schab, Schwechat, near Vienna, and Rudolf Theumer, Vienna, Austria. Filed Nov. 30, 1923, Serial No. 677,674, and in Austria Dec. 15, 1922. 6 Claims. (Cl. 67—116.)



1. In combination, a gas burner having a gas inlet, a shutting-off member to control admission of gas to the burner and a thermostatic locking device located near the burner flame and including a rigid locking member to hold the shutting-off member in its open position and a resiliently supported lock pin attached to the said rigid locking member.

1,609,930. GAS-DETECTOR ALARM AND VALVE ACTUATING MEANS. Abraham Cohen, New York, N. Y. Filed Feb. 14, 1925. Serial No. 9,228. 1 Claim. (Cl. 137—102.)



A gas detector and alarm device, which includes a gas valve, spring means engaging with a portion of said valve tending to move it to closed position, detent means normally lying in the path of a portion of said valve to hold it in an open position, an electromagnet adapted when energized to move the detent means out of the path of the operation of said valve, a circuit connected to said electromagnet, said alarm device being in said circuit, current producing means in said circuit, a switch in said circuit, a fusible member adapted to hold said switch open, said gas detector disposed in proximity to said fusible member and affected by the presence of unburned gas to generate sufficient heat to fuse said member, said switch adapted to close when released by the fusing of said member.

Utilization *of* Nation's Enormous Lignite Supplies

THE possibility of making a high grade fuel from the enormous lignite deposits of the United States, comprising nearly one-third of the total solid fuel resources of the nation, is demonstrated by the Bureau of Mines, Department of Commerce, using a cheap process for carbonizing the raw lignite and subsequently briquetting the resulting char.

Extensive lignite fields lie in States west of the Mississippi, notably in North Dakota, Montana, Wyoming, Colorado, and Texas; smaller areas occur in several other states. The total area of the deposits and the total amount of lignite in the various districts are so enormous that the potential economic value of the deposits is seldom recognized. The section of the country which contains almost one-third of the nation's entire coal resources still imports coal. Many of the deposits are in regions that are not thickly settled or well supplied with manufacturing industries. Lignites, from their peculiar physical and chemical characteristics, are low-grade fuels and almost every locality can get high-grade coal from a distance. The proximity of this section to the Great Lakes, which affords a relatively cheap means of transporting fuel from the eastern coal fields into the Northwest, has retarded the development of the full possibilities of lignite. The lignites in these areas are imperfectly developed coals. Many have a more or less woody structure; others are darker, denser, and more homogeneous, approaching subbituminous coal.

The Bureau of Mines approached the lignite problem hoping to produce for domestic purposes a satisfactory briquetted fuel with a heating value comparable with that of other good fuels, and simultaneausly to obtain data regarding the cost of operating, the yield and character of the by-products—gas, tar, and ammonia—obtainable under definite operating conditions, the approximate cost of a unit of suitable size for commercial production of such fuel, the factors bearing on the design of a suitable carbonizer, and other pertinent information. The Bureau also hoped to show the possibility of the direct use of the unbriquetted char.

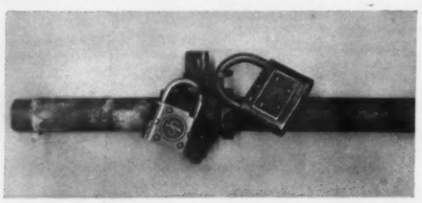
In studying the problem experiments were conducted at Salome, Ariz., Hebron, N. D., and Grand Forks, N. D. Cooperative work was carried on with the University of North Dakota and with the Lignite Utilization Board of Canada.

Carbonizers commonly used for coking bituminous coal are distinctly unsuitable for carbonizing lignite. Since lignite is a fuel of low calorific value whch yields upon distillation a relatively low percentage of char and gas of relatively low heating value, and since industries depending on lignite are not of a size to justify large expenditure, it was found essential that a relatively low-priced carbonizer of high capacity and automatic in operation should be used for carbonization. The efficiency of the carbonizing process as developed by the Bureau of Mines is very high.

The yields of by-products—gas, tar, ammonia, oil and pitch—depend upon the character and quality of the lignite carbonized, upon the completeness or degree of carbonization, and upon the method and apparatus used for carbonizing. In general the yields are lower per ton of raw lignite than per ton of bituminous coking coal and the quality of the gas is lower, sometimes very much lower than that of coal gas. The value of the by-products from the carbonization of average lignite is considerably less than the value of the by-products resulting from the carbonization of bituminous coal. The recovery of ammonia as ammonium sulphate will probably be unprofitable in the Northwest, particularly in small plants, until some time in the future. The tar and its crude distillation products have value, but in the present state of the art of refining and under present market conditions to assign a high value to the by-products or to attempt to refine the crude by-products is not advisable.

The results of these studies are contained in Bulletin 255, "Investigations of the Preparation and Use of Lignite 1918-1925," copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

SAN DIEGO GAS SERVICE MEN FIND A NEW WRINKLE



D. H. Perkins, superintendent of gas distribution for the San Diego Consolidated Gas & Electric Company, wrote to *Western Gas* recently, enclosing in his letter the photograph from which the above view was taken. "One of our customers"—writes Mr. Perkins—"objected to having his gas service discontinued, although his landlady had ordered it; but he overlooked the fact that our men carry pipe wrenches in their tool kits."

Strange doings, these, in San Diego. We wonder what the sequel was.

MINNEAPOLIS COMPANY PLANS BIG EXTENSION PROGRAM

A. H. Rand, president of the Minneapolis Gas and Light Company, Minneapolis, Minn., in commenting upon that utility's recent request for a 20-year extension of franchise, gives some idea of the extensive development program which his company has formulated, contingent upon the renewal of the franchise. Sale of new securities, and refinancing of $7,000,000 of bonds which mature in 1930, are also dependent upon securing the new franchise.

In the neighborhood of $1,300,000 will be spent to improve and add to the company's Mississippi River front manufacturing plant, and to extend mains, if the franchise is secured. Two units for manufacturing oil gas would be included in the new equipment. A new coal gas plant, to cost at least three million dollars is another major item in the company's expansion program. The complete program, roughly estimated, calls for a $4,000,000 expenditure.

Yet another move depending upon franchise renewal is the inauguration of a proposed step-rate schedule, bringing reduced charges to quantity consumers.

PLANO, TEX., TO HAVE GAS BY FEBRUARY

Plano, Tex., will be using natural gas by February 1, according to plans of the Lone Star Gas Company, which has established headquarters in that community, with G. J. Wolfe in charge of the office.

VENTURA FUEL COMPANY, NEW TRANSMISSION PROJECT

FORMATION of the Ventura Fuel Company, a new corporation controlled jointly by interests which control the Southern California and Midway Gas Companies, the Southern Counties Gas Company and the Los Angeles Gas & Electric Corporation, has recently taken place. The new corporation has been organizd to construct and operate a fifteen-inch high-pressure pipe line about 43 miles in length, which will transmit natural gas from the Ventura Avenue fields to Los Angeles city limits. The line is to be in operation by May 1 and will be the largest gas carrier in the West, having a daily capacity of 45,000,000 cubic feet.

Erection of the compressor plant on the Associated-Lloyd lease at Ventura is under the supervision of the Midway Gas Company organization, while Southern Counties Gas Company executives are in charge of the pipe line construction. A. C. Johnston, assistant treasurer and comptroller of the Southern California and Midway Companies will be in charge of the Los Angeles office of the Ventura Fuel Company.

Residents of Ventura county along the right-of-way of the new line, will have gas service for the first time as a result of this important transmission project. A cost of $2,000,000 to $2,500,000 is involved.

Equipment which will go into the new compressor station includes seven 760 H. P. twin-tandem double acting Cooper engines, with 19-inch by 24-inch power cylinders, direct connected to two-stage compressors.

SOCIETY OF GAS LIGHTING HOLDS 51ST MEET

The 51st annual meeting of the Society of Gas Lighting was held at the Hotel Astor, New York, Thursday, December 9. The following officers were elected:

President—Dr. Alex C. Humphreys.
Vice-President—W. Cullen Morris.
Treasurer—William J. Welsh.
Secretary—George G. Ramsdell.
Member of Executive Committee—Alfred E. Forstall.
Finance Committee—Clifford E. Paige, Colin C. Simpson, John S. DeHart, Jr.

The Hon. George B. Cortelyou was elected an Honorary Member of the Society.

HUNTINGTON BEACH, CALIF., MAY SELL CITY GAS SYSTEM

Municipal ownership of the gas system in Huntington Beach, Calif., is encountering some difficulties as a result of oil developments in that municipality which bid fair to prove the deciding factor in turning the gas system over to private operators. Some $10,000 worth of the city's distribution system has been rendered useless by encroachments of the oil territory, resulting in moving the residential district. This in turn is necessitating new extensions of the gas system.

For several years the Southern Counties Gas Company has been wholesaling gas to Huntington Beach, and is regarded as the logical purchaser. The matter, it is understood, will go before the voters at some indefinite date in the near future.

ERNSBERGER MEDAL OFFERED OKLAHOMA CO. EMPLOYEES

Employees of the Southwestern Light & Power Company, with headquarters in Oklahoma City, Okla., have been offered an annual reward for outstanding service. The Earl R. Ernsberger Award, as it is called, after the name of the company's president, is a gold medal.

What Is Greatest Present Need *of the* Gas Industry?

Each month WESTERN GAS is publishing one of the three-minute speeches made on the above subject at the Pacific Coast Gas Association Convention of 1926. The following speech was delivered:

By S. C. SINGER

Southern California Gas Company

TO my mind the greatest present need of the gas industry is the active fostering of public good will through a channel of definite personnel employment training.

At the present time great expense and effort is put forward in attempting to secure good will through advertising, either in the newspapers, magazines, or by means of placards; also through the furtherance of customer ownership of securities, and again through personal contact of a few employees in participation in activities of large civic organizations or civic clubs.

These are all excellent ideas and have been very successful in the results obtained, but haven't we missed a major factor in fostering good will by not keeping in our employ men and women who are of the proper temperament to properly discuss the company's affairs, insofar as their particular work is concerned, with our consumers?

TRAINING FOR GOODWILL

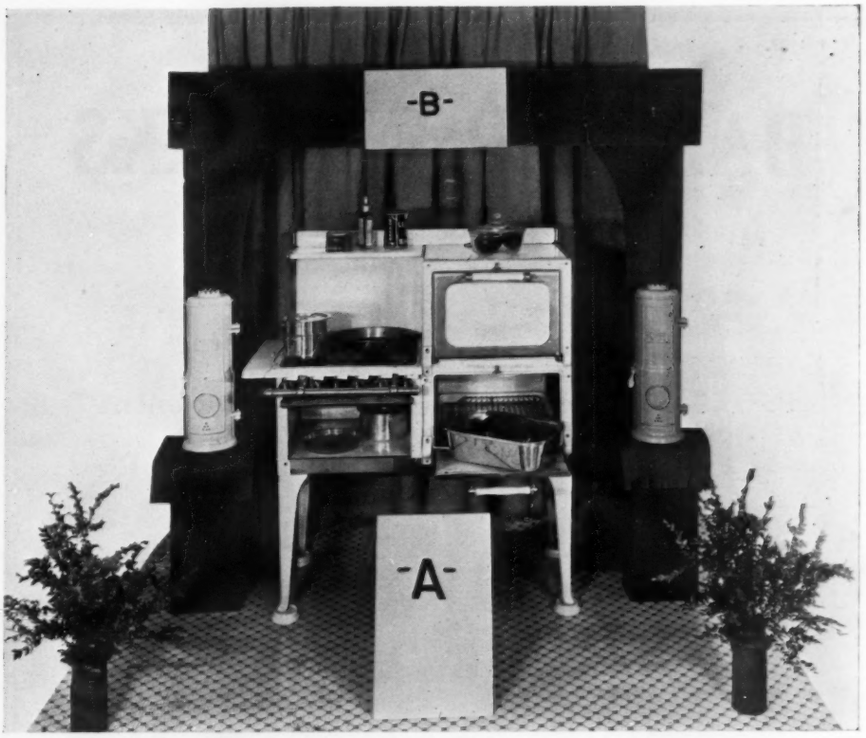
Fostering of goodwill does not necessarily accompany the educated man or woman, but is rather the growth of breeding and training, which can be cultivated and bred into employees. I appreciate the fact that it is hard to teach a man or woman to greet consumers with a pleasant word or smile, or to use the proper inflection of the voice when talking to them personally or by phone, but I believe that employees in our class of business must be trained to do this or they do not fit into our line of work.

The failure to adopt and carry out a training of goodwill policy right down in the ranks of our employees, placing behavior toward the public ahead of particular skill in the departmental work to which the employee may be assigned at that time, may mean the breaking down of the standing of that particular company in the community, resulting in the gradual loss of confidence in the company's business in favor of a more live and up-to-date organization.

EFFICIENCY NOT ENOUGH

Many of us have been employed because of our particular grade of efficiency in special lines such as manufacture, distribution, accounting or other similar important phases of the gas industry; but how many of us have been employed primarily for the purpose of fostering goodwill through daily contact with the public? Many of us analyze and work out extremely important financial problems, creating tremendous savings for our company, but if we do not show the public the justice of these accomplishments and the justice in our various rulings which may seem arbitrary, we have lost beyond repair all the good which the dollar and cent tabulation may have accomplished.

May I close with the recommendation that the guiding hands of our various companies immediately take such steps to employ such assistants as are necessary to personally instruct counter-men, fitters, meter readers, dispatchers, and such other employees who daily come in contact with the public as to the manner of proper customer attitude (if you may care to call it such) while carrying on our activities.



Frame Background *for* Range Display

VARIOUS means have been used to pictorialize the central feature of a window trim by setting it in some kind of a frame. Here is a display using a simple form of this idea as a background for a gas range. The water heaters form a subordinate but effective element in the window.

Beaver board, Upson or Cornell in 18-inch strips, six feet in length, are used to form the arch. The two strips for sides of the arch should be shaped in a curve at top and bottom, as shown. Ordinary lath at the back will hold the arch together, nailing from the front. Linoleum will make a suitable flooring.

Cover two boxes with green crepe paper, place them about two inches in front of the sides of the arch, and on them set the tank heaters. Quart milk bottles will serve as vases for suitable flowers or greens, the bottles being covered with the same color crepe as used on the boxes.

Place the range under the arch, one-third under and two-thirds in front. Posters A and B for sales messages as shown. Arrange utensils, salt, e c., on the range in natural positions.

The cost of the display should not exceed $2.00.

MID-CONTINENT O. & G. ASSN. RE-ELECT 1926 OFFICERS

Directors of the Mid-Continent Oil & Gas Association met December 7 and re-elected all officers who served during the past year. William N. Davis, of Bartlesville, enters upon another term as president. Harry H. Smith is secretary and treasurer and three vice-presidents were re-elected, as follows: W. B. Byron, Gulf Production Co., Houston; Burt H. Collins, Echo Oil Co., Tulsa; Clyde M. Bennett, Louisiana Oil Refining Corporation, Shreveport.

CITIZENS WORK TO BRING GAS TO COMMERCE, TEXAS

Natural gas is to be introduced for domestic service in Commerce, Texas, if the citizens of that community have anything to say about it. By arrangement with the Lone Star Gas Company, Commerce will be added to that utility's system when 700 customers' deposits have been put up. A number of citizens' committees have been formed to secure the necessary quota.

GAS FOR KANSAS COMMUNITY

By February 1, Salina, Kan., will be using gas from the 28-mile line now being laid from a source near the town of McPherson.

UTILITY EDUCATION PROGRESS IN COLORADO

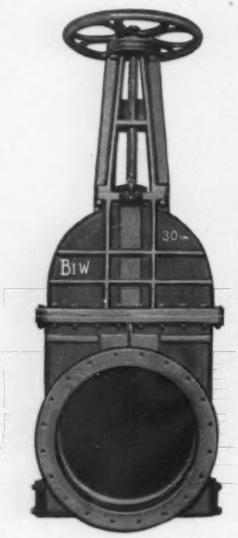
A book entitled "A Glimpse of the Public Utilities Industry" has been published by the Rocky Mountain Committee on Utility Information, and is being used by a number of high schools in Colorado as a text in courses on the utility industry. As a tie-up to this work of education in the utility field the University of Colorado has opened a correspondence course in public utilities which is offered to anyone having a high school education or its equivalent.

MONTANA OIL & GAS ASSN. OFFICERS NAMED

New officers of the Montana Chapter of the Rocky Mountain Oil & Gas Association, named at the December meeting of that body are as follows: L. B. O'Neil, president of the Northern Star Oil Refining Company and vice-president of the California Petroleum Corporation, president; LaRue Smith of the Homestake Oil Company, vice-president; Mark C. Henderson of the Sunburst Refining Company, second vice-president. C. H. Brown of the Arro Refining Company was made vice-president of the marketers' division. Walter F. Brittain was re-lected as secretary.

BAKER IRON WORKS

Los Angeles, California



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5720 Long Beach Avenue **Los Angeles, California**

The Beacon Automatic Storage Water Heater

Has a Brass Heating Element With Six Times the Heat Conductivity of Iron

The Beacon is a heavy duty appliance—high grade materials throughout. The boiler is made of heavy gauge galvanized iron and all seams are both riveted and welded.

In addition to the heart of BRASS the Beacon has a rust-proof BRASS circulating pipe which keeps the water clean.

Beacon Water Heater Co.

Geo. F. Pearse

776 So. San Pedro St. **Los Angeles, California**

MIDWEST GAS CO. RESULTS FROM BIG MERGER

The G. E. Barret & Co., investment brokers of New York and Chicago, have announced a $2,500,000 merger of gas utilities, in which are involved the Oklahoma Utilities Company and five of the outstanding producing and transporting organizations in the shale gas fields of Southeastern Kansas. Kansas utilities concerned are: Industrial Fuel Corporation, Neodesha; Wilco Oil and Gas Company, Neodesha; Fall River Gas Company, Neodesha; Lincoln Pipeline Company, Chanute; W. E. Eakin Properties, Chanute.

Chartered as a Delaware Corporation, the new organization is called the Midwest Gas Company. Its headquarters will be in Tulsa, Okla., and other offices will be maintained at Sayre, Mangum, and Lawton, Okla., as well as in Neodesha. Heading the new corporation is S. M. Williams as president; W. J. Schoonmaker, former president of the Industrial, is to be vice-president, and Wilbur J. Helleman of Oklahoma City, secretary. Douglas L. Cullison, New York, will be treasurer.

A two-million dollar issue of seven per cent gold bonds has already been underwritten, and an extensive development program is to be undertaken in Kansas and Oklahoma. Sayre, Mangum, and Lawton, Okla., communities, are to be served with natural gas through a ten-inch pipe line to be constructed from gas fields around Sayre. Distribution plants in the cities named will be expanded, two gasoline extraction plants will be erected, and about $100,000 will be spent on drilling.

Purchase of properties, new drilling, and extensions in the vicinity of Neodesha will call for an expenditure of $1,200,000. Humboldt, Kan., will be served with natural gas as a part of this program.

WHERE FLOWERS PLAYED PART IN PUBLIC RELATIONS

Clifford Johnstone, executive secretary of the Pacific Coast Gas Association, gives us this one:

During a dinner conversation the other evening someone mentioned the gas company.

"I think they are perfectly splendid," said the hostess. "We had a gas leak and paid a plumber $8.00 for trying to fix it although it continued as bad as ever. We finally called the gas company and the man who came found the leak outside and fixed it right. A few days later another man came and asked if everything was all right and then said the first man had reported that some of our flowers looked as if they had been hurt by the leaking gas, and if this was so the company wanted to replace them. Wasn't that wonderful?"

There is no harm in mentioning names when it's a question of flowers. This incident happened in the East Bay Division of the Pacific Gas & Electric Company.

LOWER RATES LOOKED FOR IN WESTERN NEVADA

A lowering of gas rates is looked for in Western Nevada as a result of proposed new schedules filed with the state commission by the Truckee River Power Company. Gas rates set by the commission some years ago range from $2.50 for the first thousand cubic feet to $1.25 a thousand for large consumers.

30 YEARS WITH KANSAS CO.

Michael J. Barry, secretary of the Kansas City (Mo.) Gas Company, celebrated the thirtieth year of his connection with that utility recently.

NEW SAN JOSE HOTEL HAS GAS EQUIPPED KITCHEN

San Jose, Calif., has a new hotel—the St. Claire. Care has been taken to make the new hostelry's appointments of the best, and hence gas has been chosen to fire all kitchen equipment. We quote from the columns of the "Western Hotel Reporter":

"The cooking at the Hotel St. Claire is done by gas on a battery of modern gas ranges. This fact alone will be a powerful factor in assuring the success of the culinary department, because with gas fuel and the proper gas ranges, the ease of operation and the certainty of heat regulation insures that the cooks will always be able to have at their command just that temperature which the work requires.

"With the gas range there is no smoke, dirt or odor, a fact that anyone can see at a glance is conducive to cleanliness and to sanitary conditions."

GAS OF CHIEF IMPORTANCE IN PANHANDLE, SAYS NEWSPAPER

Oil is of secondary importance in the Amarillo fields of the Texas Panhandle, says the Denver, Colo., Rocky Mountain News in a recent issue, the article going on to state that gas is present in amounts "staggering to the imagination." Quoting further from the same article:

"In the gas field, twenty wells now operated by the Amarillo Oil company have an aggregate open flow of 350,000,000 cubic feet a day, all at a uniform rock pressure of 437 pounds to the square inch. Many other gas wells are shut down now, until a market is found for the product, but there are today in the Panhandle, within comparatively few miles of Amarillo, between 50 and 60 natural gas wells with a potential capacity of more than a billion cubic feet a day. Should there be only one gas well on every 160 acres of the gas territory already proven, the capacity of the field would be 280 billion cubic feet a day."

HELIUM GASSER UNEXPECTED FIND OF KANSAS OPERATORS

John J. Donahue and James Donahue, gas and oil operators in the Masham district of Pawnee County, Kas., in September, 1926 brought in a heavy gas flow estimated at about 15 million cubic feet. Pipelines were laid to make this gas available for drilling purposes in the vicinity but when the gas was turned into the lines and an attempt made to use it as fuel, it turned out to be noninflammable. It was helium gas, and was mudded off from the well so that drilling might proceed after investigations revealed that there was little likelihood that the government would be interested in taking the helium out-put.

FRANCHISE GIVEN TO SERVE MONTESANO, WASH.

B. A. Garber and Dorsey Hager interests have secured a 35-year franchise to furnish Montesano, Wash., with natural gas. The Washoma Oil Company is drilling its second well near Montesano with considerable gas flow manifested.

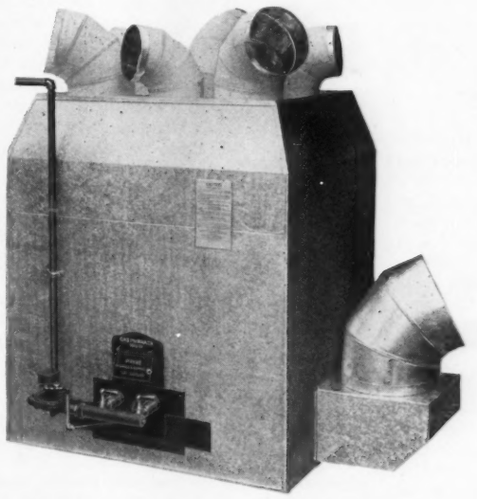
GAS EXHIBIT PLEASES AT TEXAS EXPOSITION

A mercantile and industrial exposition recently held in Beaumont, Tex., numbered among its most interesting exhibits a display of the Southwestern Gas & Electric Company. A booth containing ranges and heaters and automatic water storage systems put over the message of "comfort in the home by means of gas."

STABILITY

A Short Talk to Gas Company Executives—

The background to the Gas Industry is one showing marked stability as well as steady and conservative expansion. Our organization is likewise known for these same characteristics. It is upon this common ground that we hope to meet you in cooperative effort. We seek no special favors but offer to pool our specialized knowledge of gas fired warm air heating, our merchandising and engineering experience with yours. Insofar as our combined efforts benefit you by bringing added profits and improved public relations we hope to realize reflected benefits.



A Payne Gas Furnace just like 30,000 or more others which are now helping to show revenue and dividends on the financial statements of Pacific Coast Gas Companies.

Whether you are merchandising appliances or not our plan will help you. Our motor stands ready at your door waiting to be of service. Will you use it? No obligation.

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Electric Weld Products---

The Wood Automatic Storage Gas Water Heater

The Standard Combination Storage Gas Water Heater

Electric Weld Range Boilers and Storage Tanks

Made and Guaranteed by

John Wood Manufacturing Co.

2437 ENTERPRISE STREET **LOS ANGELES, CALIF.**

Summary *of* P. C. G. A. San Francisco Sessions

(Continued from Page 27)

ducers is the cyanides, particularly with gas going into the mains at about 200 degrees. We have never given sufficient attention to the removal of cyanide from oil gas.

FRED JONES *(San Francisco):* I think dehydration results in the precipitation of matter previously clinging to the pipe. Dust always contains a certain amount of volatile matter, nitro carbon and carbon dioxide, and it will contain iron oxide up to as high as 60 per cent. In other deposits there will be cyanide.

RECENT DEVELOPMENTS IN WATER GAS MANUFACTURE

F. W. STEERE *(Detroit):* The gas industry is fortunate in having so many processes for making gas. The process to be used is a local problem and we may be sure that no one process will ever be universally adopted.

The developments in water gas that are of particular interest are the increased fuel economics. Very few years ago the use of 35 pounds of coal or coke generator fuel was considered good practice. Now 27 pounds of well selected coke is good practice and 21 pounds has been attained under test conditions. The substitution of coal for coke is an interesting development and in cases in which the fuel has been prepared, the same fuel economy can be obtained with soft coal as with coke. Another important factor is the development of a charging machine for charging the generator while it is in operation.

A charge is introduced every cycle and placed near the edge of the generator so that the coarse pieces will roll to the center. The edge of the machine always presents the least resistance to the blast or steam and by having the fine pieces at the edge and coarse in the center a more uniform combustion is attained.

The elimination of the hot valve is the result of an invention by D. J. Young of Tacoma. A subsequent development has led to the elimination of both the upper and lower hot valve leading to less expensive maintenance.

The enlargement of connections has increased machine capacity. Various improvements have nearly doubled machine capacity in the last ten years. The use of soft coal has had a tendency to decrease capacities. In general the capacity of a set using coal is between 80 and 85 per cent of its capacity on coke.

Possibly the most difficult and disagreeable part of water gas operating is clinkering. This has been tremendously simplified by the back run and still further simplified by using coal instead of coke. Machines used in Detroit are clinkered in less than 30 minutes, as compared to a possible two or three hours under the old conditions. There is a possibility of building a continuous clinkering generator so that the clinkers will be ground out as they are in producer gas practice. Such a machine will cost more to install and maintain and its economy would have to be figured for each installation.

The water gas machine has always had a low thermal efficiency unless run in connection with a waste heat boiler. The blast gases usually leave the top of the superheater at above 1200 degrees. The introduction of Mr. Young's process in which steam is introduced at the top of the superheater has increased the thermal efficiency, as a portion of the heat which was wasted is used in super-heating the steam for the down portion of the split run and the gas leaving the bottom of the generator goes directly into the wash box. Its temperature is lowered approximately 700 degrees, and it is not reheated as it was with the hot valve method of operation. A further increase in thermal efficiency has been obtained by using water instead of steam for the back run part of the cycle. This is about one-half of the operating time so if 40 pounds of steam per M.c.f. were being used one half could be saved by using water in the top of the superheater. The most interesting part of the saving is the fact that the condensate or effluent from the plant can be used for raising this steam and there is therefore no gas house liquor leaving the plant. This has an important bearing on stream pollution.

Other recent improvements are accumulators for storing steam from pumps and blowers, sprays, and various mechanical devices, such as controls.

(Mr. Steere then described the water gas plant at Marysville, Calif. This will be the subject of an article in the February issue of *Western Gas.*)

LIQUID PURIFICATION

K. N. CUNDALL *(San Francisco):* Speaking for San Francisco I can say that liquid purification is a decided success. It is much cheaper than oxide and will remove and convert into free sulphur 90 to 100 per cent of the hydrogen sulphide. We have recently introduced an additional saving of about 10 per cent through the use of calcine, a crude soda. It is cheaper than the light ash and the impurities it contains are soluble or harmless. We also attempted the use of crude nickel but found that the impurities in it increased the hazard of tray stoppage. The removal of cyanide from the raw gas will greatly reduce the hazard of stoppages. In San Jose the trays stay relatively clean and they have practically no cyanide, continuous filtration and scientific sulphur removal.

We have been able to double the life of the filter canvas by removing the sulphur cake by use of a compressed air nozzle instead of scraping.

W. S. YARD *(San Francisco):* We have found that there is nearly a grain of cyanide per cubic foot in our oil gas. We could produce 15 tons of sodium ferro cyanide per day in San Francisco and Oakland. This is a marketable by-product.

E. N. PERCY *(San Francisco):* The sulphur comes from the purification system in the form of mud in appearance like gray clay. It has a very high toxic value as a dust or paste for spreading on plants. We found the market for paste very limited and it has proved rather difficult to dry, but we believe we have found the best method. After drying it will be ground into fine dust. The sulphur is now being marketed, partially dried in the form of a wet black sand. A small plant is being put in to produce a black cake.

We have also produced a standard yellow sulphur of the highest grade by a process of our own invention and as a second step we make carbon di-sulphide from our lampblack and sulphur. From this we can make Xanthate by a process partly of our own invention.

PROF. DE ONG *(University of California)* described the growing use of sulphur as an insecticide, a plant fertilizer and in neutralizing black alkali. The by-product sulphur is well adapted for this purpose and has every possibility of developing a world wide market.

HOT OIL SCRUBBING

R. H. HARGREAVES *(San Jose):* In scrubbing with crude oil for the removal of naphthalene we experienced the formation of a heavy pitch which was very troublesome in the yard lines. Recently some oil heaters were installed to heat the generator oil to 200 degrees and the bleeders from the generator line are led to the oil scrubbers. The oil temperature at the scrubber averages 180 degrees and the gas enters at about 75 degrees. We use about 40 gallons of oil per minute. We now eliminate all the naphthalene and cut down the pitch formation. The pitch now formed is deposited in the water scrubber which follows the oil scrubber. We are using a Thompon lawn sprinkler head in our scrubbers and find it very satisfactory.

VAN E. BRITTON *(Oakland):* By using hot oil we average 54 per cent naphthalene removal as against 30 per cent with cold oil. We find by test that 38 per cent of the total naphthalene content is removed in the water scrubbers, 52.4 per cent by the hot oil scrubber and 7.5 per cent by the rotary exhausters. We believe 100 per cent removal can be effected with hot oil, which is twice as efficient as cold oil.

K. C. TOMLINSON *(San Francisco):* Cold fuel oil has a relatively high viscosity and therefore poor contact. Hot oil has good atomization and consequently a good contact. To use hot oil successfully a continual supply of fresh oil must be used because as the naphthalene concentration in the oil increases the vapor tension builds up. The success with hot oil is due to the circulating system used.

SWING JOINTS

R. M. MCCALLEY *(Portland):* We have been using a double street ell connection where the service comes off the main and I doubt its necessity, especially as it leads to leakage. We recently laid seven miles of 4-inch high pressure main to which the services are welded. A 70 degree bend comes off the main just below top center, the bend making the turn between main and service.

FRANK ENGLISH *(San Francisco):* We still use the swing joint and the straight 45 degree ell and street tee on the high lines. In places where the ground is not solid the swing joint prevents service breakage. (This was corroborated by W. H. MacLean of San Jose, and W. F. Pape of Oakland said the swing joint made it easier to give the service the proper grade.)

R. S. FULLER *(San Francisco):* A 45 degree ell doesn't make a true swing joint. If either the main or service settles separately there is likely to be a service breakage whether there is a swing joint or not. I doubt the value of the swing joint as a preventative of breakage.

A. F. BRIDGE *(Los Angeles):* We have been brazing service connections for over a year in two districts and have abandoned saddles entirely. It represents a saving in initial cost. We use compressed natural gas with oxygen for brazing and find it cheaper and safer. Our regular crew do the work. The operation involves cutting a coupling in two transversely, brazing it to the outside of the main and testing the joint with air. Then

we screw on a corporation cock and tap the main through the cock

H. L. MASSER *(Los Angeles):* On low pressure work we screw a street tee into the brazed coupling, then a 45 degree street ell. We run the service line to the house, cap it and put in the top of the street tee another tee which has a gauge on one side. From the other side through a cycle tire valve we pump pressure into the whole service and if tight we tap through.

A F. BRIDGE *(Los Angeles)* then described a copper tubing used for services under bad soil conditions. It is one-sixteenth red brass tubing (90 per cent copper) jointed by brazing and attached to the main by a coupling through a corporation cock and a special fitting. Swing joints will probably not be necessary, due to the flexibility of the copper tubing.

COMMERCIAL SECTION

(Continued from Page 27)

helpful to industrial salesmen to publish a series of data sheets covering the costs of operation of existing installations. It is frequently difficult to get this information as it sometimes involves trade secrets and it may not be a good business policy for us to publish such material. Our present data sheets are not adequate because as every job has to be analyzed and figured differently great detail is necessary in order to make the figures on one job helpful on another.

S. R. DOWS *(Oakland):* When a man is approached he invariably asks "What is it going to cost?" and "Is anybody else using it?" Industrial data sheets help to answer these questions and I would like to see the idea carried out.

C. R. MILLER *(Portland):* Data sheets are almost indispensable. Undoubtedly we are compelled to protect information given us confidentially, but we should be able to use it ourselves. It is true, however, that an incomplete data sheet is a dangerous thing to use.

ARCHITECTS' & BUILDERS' SERVICE

W. R. ADAMS *(San Francisco):* The specifications for large buildings are largely written by engineers specializing in structural work, heating and ventilating, etc. This does not apply to smaller buildings which are designed entirely by the architect and sometimes by the builder himself. Most of these buildings are built as cheaply as is possible under the local building ordinance and any suggestions from the gas company which lead to more expensive construction are not well received. To get results we must therefore work with the few architects who are designing quality buildings or take measures to get our ideas into the building code.

C. R. MILLER *(Portland):* We have an architects' manual of about 50 pages which we keep up to date. We also have one man who regularly calls on architects. In addition we have two or three engineers who go over plans and make suggestions without charge.

C. M. GROW *(Los Angeles):* We have a heating and ventilating engineer with an assistant who devotes his time to architects.

BLUE STAR PLAN

H. M. Crawford's exposition of this plan and the gas appliance testing laboratory appeared in the December issue of *Western Gas*. The discussion brought out that tremendous expense would be incurred by duplicating the testing laboratory on the Pacific Coast, but that it would be practicable to have many models approved by inspection, thus making it unnecessary to send an entire line back by the laboratory.

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Makes joints 100% tight — absolutely leakproof where all other methods fail.

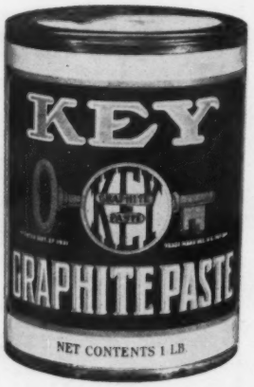
Throughout the gas industry this non-corrosive, greaseless compound is being used to end all trouble from leaky joints.

Due to its scientific preparation and graphite base, this paste is **oil, acid and gasoline proof.** It is soluble only in water. Of paste-like consistency, it is **easily spread** on pipe joints, fittings, flanges, flange unions, and every place where a leakproof joint is desired. **It expands under heat, filling every crack and crevice—then carbonizes.**

It renders joints not only leakproof, but easy to take apart if desired.

Key Graphite Paste will guarantee you a genuine service in every Department, from the Garage to the Power Plant.

Put up in any size container, from a one-pound can to a five hundred pound drum.



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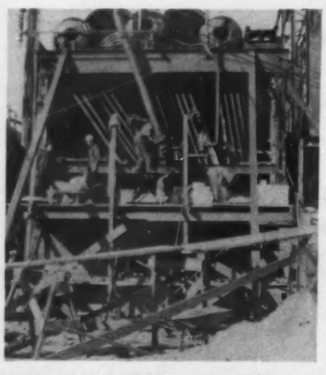

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417 Market St.

Seattle
468 Stewart Bldg.

GAS FURNACES REPLACE OIL AND SOLVE HEATING PROBLEM

The problem of successfully heating one of the oddest shaped and finest apartment buildings in Denver, Colo., was put up to the Public Service Company of Colorado, some time ago. Carmen Court, the apartment building involved, had been built in the style of old Indian pueblos, and was equipped with an oil-fired low pressure steam plant. After that equipment was installed it was found practically impossible to heat the building, and the motors which were used to blow the heat from the furnace caused a heavy, monotonous hum to pervade all the apartments. After a survey of the situation it was decided to install a battery of six individual gas-fired hot air furnaces, one for each apartment in the building. Comfortable warmth was obtained for each apartment, noise was eliminated, as was the objectionable odor which had arisen from unconsumed fuel in the previous installation.

LONE STAR GAS DEVELOPMENT CALLS FOR BIG SUM

R. A. Crawford, president of the Lone Star Gas Company, is authority for the statement that his company contemplates a development program involving a $6,000,000 expenditure and the construction of a gas line to tap the Panhandle fields and deliver gas to Fort Worth and other towns of North Texas. This will give the company a 200,000,000 foot daily capacity.

The Fort Worth Gas Company has revamped its distribution system at a number of important points, installing 12-inch and eight-inch mains to replace four-inch lines in some sections, looking to provision for community growth. The Lone Star Gas Company's line from the south will supply the new distribution service.

EXCLUSIVE GAS APPLIANCE STORE IN SAN ANTONIO

Known as the San Antonio Gas Appliance Company, a newly incorporated business establishment has opened in San Antonio, Tex. to do an exclusive business in gas appliances. Cornelius O'Neil, president, and Fred E. Alderson, vice-president, were formerly with the gas department of the San Antonio Public Service Company. Mrs. Josephine O'Neil is secretary and treasurer of the new organization.

W. J. WHEELER HEADS SAN DIEGO EMPLOYEES' ASSN.

W. J. Wheeler was in Decembr chosen as president of the Employees' Association of the San Diego Consolidated Gas & Electric Company for the new year, succeeding J. A. Harritt. Miss Edna Thoren was elected vice-president. The Association now has a membership of 900.

PLACE COMPRESSOR STATION IN SERVICE FOR MIDWAY

Station T, the new compressor plant of the Midway Gas Company in the Huntington Beach field, has been placed in operation. It has a capacity of 4,000,000 cubic feet of gas daily.

E. G. LEGE ASST. GENERAL MANAGER OF GALVESTON COMPANY

E. G. Lege, superintendent of the Galveston, Tex., Gas Company, has been made assistant general manager of that company. Mr. Lege and L. P. Leith have been appointed operating executives for the utility, in the absence of P. E. Nicholls, vice-president and general manager, who has been granted indefinite leave of absence due to ill health.

STUDY OF SCALE FORMATION IN STEAM BOILERS

The purpose of an investigation being conducted at the Pittsburgh, Pa., experiment station of the Bureau of Mines, Department of Commerce, is to determine whether the character of the precipitates forming in boilers may be made to assume a form in which they do not attach themselves to the walls; and if the material in the boiler wall exercises any influence. Data have been obtained on the noncondensible gases which are carried off in the steam, and the correct relationships to be maintained when carbonate becomes unstable and phosphate must be used in boiler water conditioning. The use of phosphate may form objectionable deposits. This condition is being looked into. Further, indicators used in titrating boiler waters do not necessarily represent the true phosphate or carbonate concentration. Means of controlling this indication are being investigated. Conditions which may bear on wet steam are being watched in the hope that definite information may be acquired on the factors influential in wet steam development and thereby control be obtained over them.

BIG SEND OUTS FOLLOW COLD SNAP IN SOUTHERN CAL.

December cold snaps brought record send outs for Los Angeles gas companies, the Los Angeles Gas & Electric Corporation reaching the hitherto unapproached figure of 147,055,000 cubic feet sent out on December 23. On December 8 the same company sent out 111,415,000 cubic feet, which was then a high mark, the previous record send out being 105,498,000 cubic feet, on December 24, 1924. Records were also hung up by the Southern California Gas Company, which on December 23 sent out 70,000,000 cubic feet over all its system for domestic use, this figure being exclusive of wholesale gas sold to other companies. This record was a 46 per cent increase over last year's high mark.

The tremendous demands for gas for domestic consumption necessitated shutting down many industrial consumers temporarily.

A. P. I. OFFICERS CHOSEN FOR 1927 AT CONVENTION

E. W. Clark, vice-president of the Union Oil Company of California, heads the American Petroleum Institute for 1927, as a result of elections at the Tulsa convention of December. Other officrs are: Vice-President (Prod.), W. N. Davis, Phillips Petroleum Co.; Vice-President (Mfg.) L. L. Marcell, White Eagle Refining Co.; Vice-President (Dist.), R. D. Benson, Tide Water Oil Co.; Treasurer, Amos L. Beaty, The Texas Company; Assistant Treasurer, Lacey Walker; General Secretary and Counsel, R. L. Welch; Assistant General Secretary and Counsel, W. R. Boyd, Jr.

DEPARTMENTAL BULLETINS ARE USEFUL TO PORTLAND G. & C.

Nearly all of the departments or bureaus of the Portland Gas & Coke Company issue weekly bulletins to all employes in addition to the Company's regular monthly magazine. Such weekly bulletins contain instructions and information applicable to all employees in the respective departments and have proven to be of considerable value in the development of a common understanding among the employees regarding the immediate problems of the various departments.

W. S. SULTAN LEAVES ARIZONA

W. S. Sultan, former manager of the Peoples' Arizona Gas & Electric Corporation, has left Globe, Ariz., to make his home in California.

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MONTAGUE PIPE & STEEL CO
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The Relation *of* Science *to* Gas

(Continued from Page 18)

placed in effect so that gas for such purposes, particularly house heating, can be sold at a price that will make it attractive and yet yield a profitable return to the gas companies.

It has been said that the electrical industry is over-burdened with scientific personnel. The gas industry on the other hand, urgently needs more technical help. There are so many appliance problems to tax the imagination of the engineer that the future possibilities for development in a scientific way are almost unlimited. For example, the study of refrigeration by gas has scarcely been touched. The application of thought and effort properly directed in a general way on this subject, should result in wonderful progress being made during the next few years. There seems to be no fundamental reason why the absorption type of refrigerator fired by gas could not be made so successful that it would render competition by other methods of refrigeration more or less ineffective.

Gas light offers the nearest approach to duplicating the sun's rays of any artificial light known. Radiant heaters throw off both heat and light rays. In fact, it is very difficult to differentiate between them. If the sun's rays are beneficial to human life then it follows that heat and light rays from radiant heaters should also be healthful. Some useful research on this problem would present a very interesting subject and if properly solved, should prove of great benefit to us all. Still further, there is considerable room for improving the efficiency and general operation of all of our domestic gas-fired appliances.

MEASURING RADIANT EFFICIENCY

Our Laboratory recently perfected an instrument for measuring the radiant efficiency of appliances that will be of great assistance in future research and routine testing work. European gas engineers are also working on this subject. The English have attempted to apply the calorimetric principle while the most successful of the German devices is somewhat similar to our own. We are using a very sensitive thermopile so delicate in fact, that the heat from a cigar can be detected at a distance of ten or twelve feet. Inasmuch as the couples must be covered to eliminate the effect of convected heat, this introduces a very interesting problem in the diathermancy of materials that must be carefully solved if reliable results are to be obtained. The unfortunate part is that the diathermancy of most substances varies considerably with the temperature of the heat source. This is particularly true of glass. Rock salt and quartz seem to be the only materials that have a fairly constant diathermancy.

The gas industry for many years has needed more information on the combustion characteristics of the different gases. Many gas company executives are now wondering just what is going to happen to their service conditions when they change from their present supply to some other kind of gas. For example, will a by-product coke oven gas which is usually lower in heat value and specific gravity than coal gas, require a different size orifice and compensating air shutter adjustments? Practically no reliable information has been assembled for general use on the combustion characteristics of mixed gas.

YEAR-'ROUND SERVICE

With thermostatically controlled gas-fired appliances to heat our homes in the winter and refrigerating systems to cool them in summer, we may look forward to an era in which gas will play a very large part in adding to the comforts and conveniences of future American homes.

Regardless of the kind of fuel used, it is only gas that burns. This is a fundamental fact and one that should not be overlooked. No matter how effective any of the heat-producing agencies are, it is difficult if not impossible to find a more practical or efficient means of supplying heat than by gas.

The gas industry needs more science in its business, and fortunately within the past few years has come to recognize the necessity of it. More engineers will take up a study of the use of gas and it does not seem possible that they could be engaged in a more worthy or satisfactory occupation than that of raising the standards of living and contributing to the future welfare of mankind.

ICE IN NATURAL GAS LINES IS PROBLEM OF COLD REGIONS

Cold weather brings many problems of natural gas service, says a newspaper story from Edmonton, Alberta. An 83-mile gas line supplying Edmonton behaves admirably during the cold months, but when spring thaws come, the ice formed from condensation of moisture in the warm gas is released, and has a tendency to telescope in the lines. Alcohol is run into the pipe to meet this condition, and gas is forced into the line from a point below the jam, breaking down the ice which is then gotten rid of through a drip.

NEW GAS SET FOR PANAMA-COLON GAS COMPANY

At the Colon plant of the Panama-Colon Gas Company a new Jones oil gas machine with a 500,000 cu. ft. daily gas capacity has been installed to handle increased business on the company's Atlantic side. R. G. Light, superintendent of manufacture at the Colon plant, had charge of installing the set.

DENVER WOMEN ENROLLED FOR COURSE IN UTILITIES

Nineteen women employees of the Public Service Company of Colorado, Denver, Colo., have enrolled in a course in public utilities offered by the University of Colorado. All are members of the Women's Committee of the company.

NEW LANKERSHIM, CAL., OFFICE OPENED BY GAS COMPANY

The Southern California Gas Company has opened its new office at Lankershim, Calif., with Edna G. Westerfield as manager. In the last three years the number of meters in the Lankershim district has increased from 832 to 2945.

GAS LINE TO SALINA, KANSAS

Hope Engineering Company has contracted to lay a 10-mile eight-inch gas line from the McPhereson-Lindsborg-Salina natural gas field to Salina, Kan., the project to cost about $225,000.

SAN DIEGO CONSOLIDATED HAS WOMAN'S COMMITTEE

At a dinner gathering of women employees of the San Diego Consolidated Gas & Electric Company, held at the Cabrillo Cafe in San Diego during December there was formed a new organization, known as the Woman's Committee, with Miss Nell Molley as chairman of the local unit.

This, the first general meeting of women employees of the San Diego company, was sponsored by William F. Raber, vice-president and general manager of the company. Mr. Raber was the first speaker to address the gathering, emphasizing the point that inasmuch as the universal use of gas and electricity had accomplished so much in minimizing the duties of the American housewife, it was extremely fitting that the woman employees of a gas and electric company should meet to learn more of that company's products and the operation of convenient appliances.

FIGURES ON BUILDING GAINS IN WESTERN CITIES

Western cities showing an increase in building activities for the month of November, 1926, as compared with November, 1925, according to the F. W. Dodge Corporation's report, are as follows: Los Angeles $8,688,300 for November 1926 as compared to $8,412,400 for November, 1925; San Diego $2,000,500 to $1,342,800; San Jose $500,500 to $222,200; Santa Ana $185,000 to $92,800; Seattle $2,280,800 to $1,452,800; Salt Lake City $389,900 to $259,500; Boise $62,400 to $52,800; Albuquerque $159,600 to $62,600. The report shows a falling off of $36,776,800 in the country at large for November 1926 compared to November 1925.

COLORADO GASSERS THOUGHT TO OPEN NEW AREAS

Regarded as significant because it is the first strike made on the McCallum structure, a new gas well flowing about 10,000 cubic feet daily was brought in December 13 on the McCallum dome near Walden, Colo., by the Continental Oil Company. The gas is wet, say company officials.

Following the Continental's discovery by only a few hours the Marland Oil Company brought in another sizable gasser on the Iles structure in Moffat county.

FUEL CRISIS FACES AUGUSTA, KAN.; MAY GRANT FRANCHISE

Augusta, Kansas, once in the heart of the Midcontinent oil and gas developments, is facing a fuel crisis from inadequate natural gas supply. The city's municipal gas department has previously purchased its gas from local wholesaling companies, which are now unable to develop sufficient supply for a franchise to serve gas to the community, and the city council is placing the issue before city voters for action.

TUCSON GAS LINE TRENCH DISTURBS CORPSES

Digging a ditch for a gas main through the northern part of Tucson, Ariz., workers for the Tucson Electric Light and Power Company unearthed more than a dozen graves containing human bones. When the former cemetery was abandoned eleven years ago, workmen failed to remove all of the bodies to the new location.

TWO MORE TEXAS CENTERS ON GAS LINES

Richardson and Plano, communities of Texas, are in line for natural gas service, as a result of a pipeline project recently begun.

NATURAL GAS EXPECTED FOR BATON ROUGE, LA.

Natural gas service for Baton Rouge, La., looms as a development of early 1927. The Interstate Natural Gas Company will deliver the gas to the Baton Rouge Electric Company for distribution. Pipe line and compressor station investment involved is given at $12,000,000.

PAYNE FURNACE OFFICE IN SAN FRANCISCO OPENED

Payne Furnace & Supply Company has opened an office at 478 Sutter Street, San Francisco, with H. L. Eckenroth as manager. Mr. Eckenroth was at one time heating engineer for the Pacific Gas & Electric Company.

DALLAS GAS CORP. SOLD TO NEW YORK OPERATOR

W. V. N. Powelson of New York has purchased the Dallas Gas Corporation, an organization holding the stock of the Dallas Gas Company and the County Gas Company, which serve the city and vicinity of Dallas, Texas. H. D. Walbridge and associates were owners of the Dallas Gas Corporation. No changes in local management will be made, and the transfer will not affect the rate issue pending between the utility and the city of Dallas.

PINTSCH GAS MADE BY TEXAS GAS PLANT

When natural gas was introduced to Houston, Texas, the artificial gas manufacturing plant of the Houston Gas and Fuel Company was on a fair way to be put on the shelf. However, an interesting side-line has been developed for the gas plant, in the manufacture of Pintsch gas which is compressed and used in lighting and heating railway passenger cars. Only one boiler is kept running in the manufacture of this product.

EXCAVATIONS COMPLETE FOR INLAND EMPIRE GAS CO.

Inland Empire Gas Company, the organization recently formed to serve gas in Imperial Valley, Calif., has completed excavations for its plant in El Centro. The estimated population to be served is 50,000, since the company's operations will extend from Coachella in the northern end of the Valley to Calexico on the south. Extension into Mexican territory will be made under arrangement with a syndicate of Mexican business men.

VOL. 17—P. C. G. A. PROCEEDINGS DISTRIBUTED TO MEMBERS

Volume 17 of the Pacific Coast Gas Association Proceedings, covering the work of the year 1926, is off the press and has been distributed to members of the Association.

ESTIMATE COST FOR TRACY GAS PLANT

Leon Melikov of Los Angeles, to whom has been assigned the franchise for the gas plant at Tracy, Calif., recently granted John F. Beale by the Tracy board of trustees, has submitted plans to the state railroad commission estimating the cost of the plant's construction at $145,000.

NEW GARAGE TO BE BUILT BY ALBUQUERQUE COMPANY

A $7,000 concrete garage to house trucks of the Albuquerque Gas & Electric Company is to be built at John Street and Gold Avenue, Albuquerque. The company is also making a $1,000 addition to its coal storage facilities.

A FIFTY per cent increase in business! —our showing so far this year. The extraordinary merit of AMRECO Products is becoming more generally known and consequently their use is increasing by leaps and bounds. Yet AMRECO Checkers can be delivered from stock. Write, wire, or phone for prices and details TODAY!

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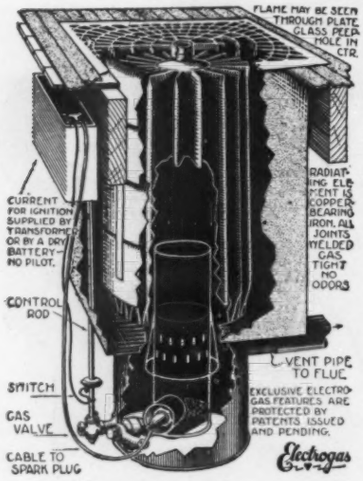
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CAL. PET. CO. TAKES OVER SANDOMA PLANT

The California Petroleum Corporation has taken over the gasoline plant of the Sandoma Gasoline Company in the Santa Fe Springs field, Southern California.

PHIL DRACHMAN IN EMPLOY OF ARIZONA POWER CO.

Phil Drachman, former sales-manager of the Gas and Electric Power Company of Tucson, Ariz., is now with the Arizona Power Company of Prescott, Ariz., where he has charge of the sales department and serves also as contact superintendent.

DRILL FOR GAS, OIL, AND HOT WATER

A company has been organized in Soda Springs, Idaho, to drill for hot water, as well as gas and oil, in the immediate vicinity of the community. Possibilities of securing hot water in commercial quantities in this section have been rumored for many years.

A. F. ERICKSON CO. TO MOVE HEADQUARTERS TO L. A.

The Arthur F. Erickson Company plans to move its office headquarters to Los Angeles, effective February 1. Mr. Erickson will assume personal charge of the Los Angeles office.

CENTRAL CITIES UTILITIES BUYS LA MARS COMPANY

The Central Cities Utilities Company, Des Moines, Ia., has purchased the La Mars Gas Company. L. E. Thompson was former owner.

SOUTHWEST PUBLIC SERVICE ASSN. MEETS IN NEW ORLEANS

April 26-29, 1927, is the date for the next convention of the Southwestern Public Service Association, to be held in New Orleans, La.

OHIO OIL BUYS ABSORPTION PLANT FOR LANCE CREEK

The Ohio Oil Company has purchased the absorption plant of the E. T. Williams Oil Company on Salt Creek and is installing it to treat gas from the company's wells in the Lance Creek field. The dry gas will probably be sold to the Continental Oil Company which is installing a complete carbon black plant in connection with J. H. Huber & Company at Lance Creek.

REVAMP EMPORIA MAINS FOR NATURAL GAS SERVICE

Natural gas is to be brought to Emporia, Kan., from Elmdale, and Carl Wyckoff, manager of the Emporia Gas Company, is directing the enlargement of the city distribution system in preparation for the new service. About $35,000 is being expended by the company.

STEPHENS FUEL COMPANY GETS FRANCHISE FOR ARK. TOWN.

Stephens Fuel Company has been granted a franchise to serve Stephens, Ark., with natural gas, and service should be in operation about the first of the year.

NATURAL GASOLINE MFGRS. TO HOLD TULSA MEET IN APRIL

A three days' convention is to be held by the Association of Natural Gasoline Manufacturers in Tulsa on April 19, 20 and 21. Much of the 1927 program will be given over to hearing a report by Dr. G. G. Brown of the University of Michigan, who is directing the research work of the association.

A Rubaiyat from the Gas Works

By FANNY S. McDONALD
President, Women's Club, Louisville Gas & Electric Company

In the November, 1926 issue of "Byllesby Management" there appeared the following gem, which we reprint for the benefit of WESTERN GAS' readers, with no apology to Omar.

Wake! for the mercury has gone below
The Zero point, and bitter winds do blow,
And down and down the pressure goes; and scores
Of clamoring customers do wait below.

And he who husbanded his gas with care
And he who flung it to the empty air
Alike to no such Seraphs have been turned
As will not, every month, their bills compare.

The moving meter metes, and fast or slow
Moves on, nor all your scalding tears nor woe
Can lure it back a single cubic foot,
Nor all your cuss-words make it slower go.

Myself, when young, did eagerly peruse
Pamphlet and ad, to get the latest news
Of Scrubber, Boiler, Valve, Exhauster, Pump,
But evermore my mind grew more confused.

Early the magazines did I look through
And eagerly inquired of all I knew,
But all the information that I gleaned
Was, "'Twill be wrong, no matter what you do!"

Why, if this rotten stuff is not oxide,
And if our gas must go unpurified,
Were't not a shame, were't not a shame, the way
The Gentleman that sold it to us lied?

The Perfect Plant men set their hearts upon
Is built and costs a lot; and then, anon,
Like a stopcock left open for a space,
Smells bad a little while, and then 'tis gone.

Whether in Boston or in Kalamazoo,
Whether the process ancient is, or new,
The Superheater don't heat worth a cent,
The Scrubber won't scrub, as 'twas meant to do.

A Model Plant—I care not where nor how—
An even Load, a Holder full, and Thou
To charm away the public's peevishness—
A Gas Works then were Paradise, I vow.

INDUSTRIAL RATES DROP ON COAST COUNTIES LINES

A five to ten per cent reduction in industrial rates will become effective in the California communities of Watsonville, Santa Cruz, Gilroy and Hollister, on the lines of the Coast Counties Gas & Electric Company on January 10, the new rates made possible as a result of a considerable industrial development in these centers in the past three years.

NEW CORPORATION BUYS GAS UTILITY OF WASHINGTON

The Washington Gas and Electric Company, a corporation newly formed at Seattle, Wash., has purchased the North Pacific Public Service Company which has supplied gas to Aberdeen, Hoquiam, Chehalis and Centralia.

TEMPERATURE FLUCTUATIONS OF GAS IN PIPE LINES

PIPE lines through which natural gas is flowing should be buried in order to minimize fluctuations in the temperature of the gas, as these fluctuations have several harmful effects, states the Bureau of Mines, Department of Commerce, which has made a study of the subject, in cooperation with the State of Oklahoma.

One very important effect of fluctuation in temperature has been observed, when the leakage of gas from transmission lines constructed on top of the ground was compared with that from lines covered with earth. The rapid temperature fluctuations, when the lines are exposed to the rays of the sun, cause expansion and contraction in the joints and increase the leakage of gas. This effect has been more noticeable in lines with screwed and rubber-coupled joints than in welded lines. A striking example of this was found in a leakage survey recently completed by the Bureau of Mines. A transmission system in a hilly district was tested for leakage. In the roughest part of the district where the lines were uncovered on account of the high initial cost of ditching, the annual leakage averaged about 2,000,000 cubic feet per mile of 3-inch line at 100 pounds per square inch gage pressure. On the same transmission system, where the topography was more favorable for ditching, and the lines were buried, the annual leakage varied from only 100,000 to 200,000 cubic feet.

MEASUREMENT ACCURACY DECREASED

Another effect of temperature fluctuation is to decrease the accuracy of measurements of gas volume. In order to meter properly the quantity of gas flowing past any point in a transmission system, it is necessary to know the temperature of the gas. If the temperature remains fairly constant, the gas flow can be measured with a close degree of accuracy, but if it fluctuates rapidly, close measurement is impossible.

The accuracy of volumetric measurement is greatest when the temperature of the gas is nearest to the standard temperature of 60°F. This is due to the necessity of applying a correction to the apparent volume of gas as measured at other temperatures, in order to determine the true volume at 60 degrees. There is usually more or less error introduced in making such corrections, and this error is greater the larger the correction.

BUREAU HAS YEAR'S TEST RECORDS

In order to estimate the magnitude of these temperature fluctuations, records were kept by the Bureau of Mines for a period of one year of the temperatures of natural gas flowing in buried and uncovered pipe lines. It is hoped that these records will serve as a basis for explaining differences in leakage rates from buried and uncovered transmission lines, "breathing losses" in gasoline pipe lines, and apparent errors in natural gas measurements.

Details of this investigation are contained in Serial 2771, "Fluctuations in the Temperature of Natural Gas Flowing in Buried and in Uncovered Pipe Lines," by E. L. Rawlins, associate natural gas engineer, copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

NATURAL GAS POPULAR FUEL IN FORT COLLINS, COLO.

Natural gas has been in use in Fort Collins, Colo., less than a year but the residents are taking to the new fuel rapidly, the send-out having risen from the initial figure of 86,000 cu. ft. a day to almost two million feet.

Heating *the* Home

(Continued from Page 29)

house produced heat while other supplied cold air back to the furnace, because the cold air supply was not ample; and in the latter, he found that all the registers produced cold air instead of warm air because too much air was allowed to come into the furnace.

Up to this time few realized that the fireplace had such an important part in furnace heating, but as soon as it was realized that the fireplace produced ventilation, man found that he could take a supply of air from outdoors and therefore the cold air return duct was done away with to a certain extent. However, the writer believes this system cannot compare to the modern cold air return system for quick and lasting results, not mentioning the great saving in fuel. Where the latter system can be carried out to the extent of having a cold air return from every room where a warm air register is placed, the results are phenomenal, because a full, free and easy flow of warm air can be had from each register, provided the furnace is of ample size to supply all pipes connected.

There is only one question or objection that ever arises to the minds of the unfamiliar user of this system and that is a misleading one. Most people believe that in a job of this kind there is not an ample flow of fresh air. However, this is an erroneous impression, as there is enough leakage around the doors and windows to supply ample ventilation. This leakage of cold air falls to the floor line as soon as it enters the building. Being cold and heavy the first place it goes is down through the cold air register, which is open. That same fresh clean cold air is converted by the furnace into warm air before it comes back through the warm air registers which are open. Ventilation of the best is produced while on the other hand in buildings where there is no furnace a lack of ventilation prevails.

In the improvement of radiating surfaces man built his radiators with studs, ribs, corrugations and oftentimes covered these with strips of metal in any way to produce more radiation. The interiors of these furnaces often looked like Christmas trees. Some built their furnaces high, and some built them low.

It was soon found out that all of this extra radiation only retarded the flow of air and cut down the efficiency of the furnace. At first furnaces were enclosed within brick settings and a little later these settings were separated by dead air spaces in the walls so as to conserve the loss of heat in the cellar. But as furnaces took more definite form, better heating was produced by smooth radiating surfaces and metal casing.

All sorts of heating "stunts" were tried. Combination hot water and hot air furnaces were produced. In the evolution of the work the air was taken in at the top of the setting, allowing it to pass down between two brick walls and enter the base of the furnace. In other settings the air was allowed to enter the bottom, from the basement, and was also piped in from inside as well as from outdoors. But as man progressed and his methods of living improved, he was not satisfied and demanded better heating. Since the chimneys were improved, so better combustion could be produced, furnaces of simpler construction and proper proportions of air were undertaken, until at this writing it is only necessary to push a button to get almost immediate results from the furnace in the cellar.

But all of these furnaces which we have talked about cannot in themselves make a successful heating job unless the conditions under which they are installed are proper The function of any warm air furnace is to heat air. The function of the warm air pipes is to convey heated air. But if the proper air circulations are not provided the furnace in the cellar will be all for naught. It will be a dismal failure, whether it be a unit gas furnace, central gas furnace, coal or wood or oil furnace.

UNIT SYSTEM POPULAR

Of all of the various heating methods metioned above, the most popular system, especially on the Pacific Coast at the present writing, is the unit gas-fired system. The unit furnace is the latest development of the gas warm air furnace. However, it is not altogether a new idea, as this system was used with coal and wood furnaces when the writer was a boy.

Since the advent of the gas-fired furnace the scope of the unit system has been extended and if when planning a new home the heating system is laid out by a competent warm air heating engineer so that the furnaces can be scattered around under the building at close proximity to the registers, the heating results will be phenomenal. Right here the writer would like to give a little advice to the prospective owner or builder;—do not allow the expense of an extra excavation to stand in the way of a proper heating system, as this added expense will soon be saved in gas bills and the user of the heating plant will shout its praises to the skies.

One of the points that has made the unit furnace stand out so vividly is the convenience of the electric control. These electric switches can be placed in any convenient spot and the wires which connect these switches to the electric magnetic valves on the furnaces can be run in almost any space or through the partitions, as the current that supplies these valves is reduced through a transformer so that bell wires can be used without danger of fire or other trouble.

A home can be decorated by the most renowned artist; the furnishings selected by the most painstaking methods, but if the heating plant is neglected the home becomes a vault where only fossils dwell.

Most furnaces have diseases. Wood and coal furnaces generally have intestinal troubles and need a laxative administered by a good chimney sweep quite often. Others have lung trouble and find it hard to breathe. But the most prevalent disease among gas furnaces is dropsy. They just fill up with condensation, drown and die.

DUST CAUSES DALLAS COMPANY TO USE OIL SPRAY FILTERS

Oil spray filters are to be installed in supply mains bringing gas to Dallas, Tex., from the oil fields. The Dallas Gas Company has experienced some trouble with dust particles in the gas, causing burner difficulties on its lines.

CUT BANK, MONTANA, GRANTS FRANCHISE FOR GAS

The town of Cut Bank, Montana, has franchised a number of men interested in the Berger gas well, brought in in wildcat territory, 18 miles north of the community, to pipe gas from the well to the city.

Gasoline Plants Meet Novel Foundation Problem

(Continued from Page 30)

are going down at the rate of 50 a day.

Because of the vibration factor the engine room foundation presents the greatest problem. The company has taken particular pains to specify engine equipment which will reduce vibration to a minimum, four three-cylinder vertical engines of 300 R.P.M. being selected. These will be belted to compressors having 16 by 16 cylinders. The plant will operate at 60-pound pressure. Foundations for the engine room building, and for the engines and compressor units will be tied together in one immense concrete slab. Three feet under the ground floor of the plant will be a concrete sub-flooring nine inches thick. This will permit piping to be installed in the dirt fill between the sub-flooring and the three-inch concrete ground floor, making it unnecessary to go through the nine-inch flooring when making repairs or additions to piping. This sub-flooring will also reduce corrosion to a minimum, and with soil and water conditions as they are, the corrosion problem will be a real one.

The pumphouse foundation, which is a part of the engine room slab, has the same sub-flooring as has the engine room, and hence the combined foundation for engine room and pump house is a solid mat of concrete measuring 130 feet by 40 feet, and tied together so that the settling of individual equipment will be impossible. When it settles the foundation must settle as a whole, which it is expected to do.

Auxiliary pump house equipment will be gas engine driven, the engines driving a line shaft which will be connected to all the pumps in the plant—the triplex oil pumps for circulating absorption oil and the centrifugal water pumps for circulating water over the cooling towers. Duplex steam pumps are to be installed for stand-by service.

Sufficient piling has been driven inside the engine room limits to permit of later installing one additional engine and compressor unit, and by extending the wall of the engine room to take in piling already driven outside its limits the plant can be given a capacity of 30,000 gallons a day.

No piling is being placed under the cooling towers as the weight per square foot of the towers is relatively low. The bottom of the cooling towers is being ribbed off into eight foot squares with ribs 12 inches wide and extending 18 inches into the ground.

S. K. Whipple, a civil engineer from the office of H. H. Hall, chief engineer of the Standard Oil Company with offices at San Francisco, spent about three weeks in Southern California, his attention being directed at a special design for the piling and foundation of the Seal Beach plant. Except for the piling and foundation, the design of the plant was under the direction of H. J. Maxwell, engineer of design for the Standard Gasoline Company, and the construction work is being done by the construction department of that organization.

Although this plant will have been constructed at a cost approximately 20 per cent above that of a similar plant built on hard ground the only part of the structure which would represent a total loss in case of failure of the field would be the foundation, as standard equipment used on the company's system of 40 gasoline plants is going into the Seal Beach plant.

Piling for this plant was driven before road work to the plant site was completed. A gravel road is now under construction and all fabricated materials are ready to be assembled as soon as they can be transported to the location. A road built up four feet above the highest tide mark now surrounds the plant, representing an additional protection against high tide.

Natural Gas, Gasoline *at* Huntington Beach

(Continued from Page 31)

have been advanced for this phenomenon, none of which appears to be wholly satisfactory. We discuss below two theories which seem plausible.

The first theory is that the decline in gasoline content is due to cooling of the oil-bearing strata by invading water. The oil and gas have been coming from practically all of the wells at comparatively high temperatures, ranging from about 105 deg. F. to 135 deg. or over. If, due to the withdrawal of the oil and gas from the structure, cold water from a distant outcrop in the ocean or from some other source is invading the sands, it would gradually cool the oil and thus cause the gas to become leaner. Unfortunately, no records appear to have been kept of flow temperatures from wells which have shown a decline in gas quality, and hence it cannot be stated definitely that such cooling is taking place. This theory is given some support by the fact that during the last ten days (up to December 22) about fifteen of the wells which were previously producing practically clean oil have begun to show water in serious amounts. In one extreme case the water percentage has jumped from 6 per cent to 72 per cent in that time.

One of the geologists who has been in close touch with the Townsite field since the beginning suggests that this sudden invasion of water may be accelerating the draining of oil from some of the sands, and hence may account for the increase in gas production observed at some of the wells as mentioned above.

Another bit of evidence which would seem to strengthen this theory is the fact that the recent completions have not shown as high an initial gasoline content as the earlier wells. Some of the latest wells showed a gasoline content on flush of about 2.0 G. P. M., which then declined to about 1.2 G. P. M. within ten days or so. This would be an obvious result of any general cooling of the producing zones.

The other theory suggests that the decline in quality may be due to the infiltration of lean gas from other zones into the stream of production, as pressure is relieved at the producing horizon. This could easily occur, since most of the perforated strings span a large range in depth. However, this field apparently lacks the upper zone of lean, high pressure gas found in many of the other local fields, and hence the source of the diluting gas required by this theory is not evident.

FIELD'S FUTURE UNCERTAIN

Opinions differ widely as to the future of the field. The structure apparently begins to plunge as it approaches Seventeenth Street, and many operators believe that the field is already pretty well defined. Several wells have been started southeast of Seventeenth Street, so that this question will be settled in a few weeks.

If the field does not extend much beyond the present limits, the peak of gas production will probably be reached about March 1st, 1927, and will probably amount to somewhere between 30 and 50 million feet net from the field per day. These predictions are based on the roughest calculations from present well averages and rates of completion, since conditions now are much too confused to permit any close estimating.

BUREAU ADVISES ON SAFETY IN GASOLINE PLANTS

IN the operation of natural gas-gasoline plants natural gas and gasoline vapors may ignite from a great many causes, states the Bureau of Mines, Department of Commerce. A few of these are: hot exhaust pipes; glowing carbon on exhaust valve stems; short circuit of a spark plug lead with a ground; a spark across the magneto; back fire from an engine; defects in lighting systems; sparks caused by dropping tools on metal floor plates and concrete floors; open fires under near-by boilers and heaters; and static sparks.

Every effort should be made to avoid explosion and fire in gas-filled rooms and surrounding yards, says the Bureau. Every workman about a plant should know exactly what to do when an emergency arises as quick action is necessary either in cutting out the impaired unit or shutting down the plant entirely. Fires under near-by boiler and heaters should be extinguished immediately. Should a fire occur, all efforts should be directed intelligently toward localizing and extinguishing it as quickly as possible with due consideration to the safety of the workmen.

Every gasoline plant should have a safety committee composed of three or five employees whose duties are to inspect the plant at regular and frequent intervals. They should receive and act upon all safety suggestions that are turned in by employees and should enforce the safety regulations that are put into effect. Every employee about gasoline plants should be trained in first aid and artificial respiration. At least two men on each tour should be experienced in the methods of applying artificial respiration.

SPECIFICATIONS STUDY OF GASOLINE MFGRS.

The gas testing committee of the Association of Natural Gasoline Manufacturers proposes to adopt a set of standard specifications for gravity balances and bottles, both special apparatus used in gas testing. The first meeting of the committee to work on standards was held on December 14. The committee hopes it will be able to complete its work on the subject before the next annual convention of the organization, usually held in April.

GASOLINE CONTENT GAINS AS SANTA FE SPRINGS GAS LOW

While the natural gas yield in the field at Santa Fe Springs, Calif., has greatly decreased, the gasoline content of the gas has manifested a startling increase. It ranges now around 3½ gallons per 1,000 cu. ft.; the original gas yield was about three-quarters of a gallon.

K. L. REYNOLDS LEAVES ON ROUND THE WORLD TRIP

Kenyon L. Reynolds and his wife leave Los Angeles early in January on a trip around the world, to be gone about six months. Mr. Reynolds was formerly general manager of the Pacific Gasoline Company.

GILMORE COMPANY TO HAVE TEXAS GASOLINE PLANT

Located near Mineral Wells, Texas, a high pressure absorption gasoline plant to be built by the Forrest E. Gilmore Company of California, will strip the gas supplied to Mineral Wells and Weatherford by the Upham Gas Company. The gas has an average gasoline content of one-half gallon per M.C.F.; the peak volume of eight million cubic feet daily will be available to the Gilmore plant only during winter months.

R. E. BERING IN UTAH; HARE GEN'L MGR. OF CALIF. GASOLINE

R. E. Bering, vice-president and manager of the California Gasoline Company, a subsidiary of the California Petroleum Corporation, has transfered his scene of activities from Los Angeles to Salt Lake City, Utah, having recently been made president and general manager of the California Petroleum Corporation in Utah. J. E. Hare, formerly assistant general manager of California Gasoline, is now serving as general manager of that company.

GASOLINE PLANT LITERATURE

The Newton Process Manufacturing Company, Fullerton, Calif., has prepared some descriptive literature on its gasoline absorption process, which may be had by addressing the company.

U. S. GEOLOGICAL SURVEY TO HAVE SAPULPA OFFICE

The U. S. Geological Survey will open a sub-office of its conservation division in Sapulpa about January 3. It will function under the division office at Muskogee in supervising operation on leased Indian lands. An office probably will be opened in February at Holdenville. Other sub-offices are now maintained at Okmulgee, Cushing and Ardmore.

CAN MOVE CASINGHEAD WITH CRUDE WITHOUT PENALTY

Casinghead gas, extracted from crude in the process of pumping, when condensed, may be restored to the crude and the mixture in the future may be moved by rail without the payment of penalty rates, as at present. It has been so decided by the Interstate Commerce Commission.

PORTABLE ALL METAL COOLING TOWER FOR GASOLINE PLANTS

A portable all metal water cooling tower for natural gasoline plants designed to prevent wind losses of water has been invented by Alexander B. Morris of the Chestnut & Smith Corporation. Automatic closing of louvers on the leeward side of the tower with a compensating opening on the windward side is the principal feature of the invention.

STANDARD CHANGES BOOSTER TO ABSORPTION PLANT

One of the booster plants of the Standard Gasoline Company in the Huntington Beach field is being changed over to a combination compressor and oil absorption plant, to have a capacity of 15,000 gallons daily. Nine engine compressor units and two of the Southwest Engineering Company's absorption units are to be added.

Drs. Kurt Peters, and Jacob Paneth, chemists of the University of Berlin, claim to have succeeded in making helium out of hydrogen, according to newspaper report. If adapted to commercial purposes, such discovery would revolutionize the present costly process of extracting helium gas from natural gas.

-how many bubbles to a cubic foot ?

and how many sq. feet of bubble film to one cubic foot ?

The greater the area of bubble film in an absorption tower the more thorough the extraction of gasoline from gas.

It takes a heap of figuring to calculate the number of square feet of bubble film to each cubic foot of froth in a Campbell Oil-Froth Absorber.

As near as we can estimate, there are approximately 2173 square feet of film to every cubic foot. That gives you an idea of the big spread of contacting area.

May we send our Catalog?

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The EMPIRE

Positive displacement, oscillating piston design.

Different from every other type of meter.

Unsurpassed in over forty years for accuracy, durability, and low cost of upkeep.

Used with highest satisfaction by

Gas Companies

in every section of the country.

Made in all sizes, 5/8 in. to 6 in., inclusive.

EMPIRE Oscillating Piston Oil Meters are fully described and illustrated in Circular 110-W. Send postal for your copy.

National Meter Company

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NATURAL GAS GASOLINE OPERATIONS

Compiled by E. T. Knudsen

Department of Commerce, Bureau of Mines, Division of Mineral Resources and Statistics

ONE hundred and forty-six natural gas plants with a daily indicated capacity of 1,172,621 thousand cubic feet, report a recovery of 36,429,695 gallons of natural gas gasoline from 26,579,941 thousand cubic feet of gas treated in November. This is an increase of 1447 barrels in daily average production.

Utilization of natural-gas gasoline amounted to 856,254 barrels, a decrease under October of 23,818 barrels. Daily average utilization of 28,542 barrels was 370 barrels less than daily average production of 28,912 barrels.

Stocks of natural-gas gasoline at the end of November amounted to 280,561 barrels, of which 33,304 barrels were reported by natural-gas gasoline plant operators and 247,257 barrels by refinery operators. This is an increase of 11,110 barrels over October stocks. This stock figure of 280,561 barrels is approximately ten days supply at the current rate of consumption.

Production of gasoline during the month of November amounted to 4,339,265 barrels, a daily average of 144,642 barrels. This is a decrease of 35,574 barrels or .81 per cent under the October output and an increase of 712,428 barrels or 19.64 per cent over the output of November 1925.

Of the gasoline produced 4318 barrels were reported as finished gasoline produced by natural-gas gasoline plant operators. Production of gasoline from cracking processes increased in November to 330,177 barrels. Stocks of gasoline show an increase of 541,138 barrels during November and at the end of the month amounted to 10,231,371 barrels. This stock figure includes 194 barrels of finished gasoline reported by natural-gas gasoline plant operators.

CALIFORNIA NATURAL-GAS GASOLINE PRODUCTION, DISTRIBUTION AND STOCKS
November, 1926

PRODUCTION			
Type of Plant	*Gas Treated M. Cu. Ft.*	*Natural-gas Gasoline Produced Gallons*	*Gasoline Recovery per MCF Gas Treated*
Oil Absorption	11,645,754	17,014,420	1.461 Gal.
Compressor	308,194	518,098	1.681 "
Combination Comp. and Oil Absorption	8,116,876	12,834,094	1.581 "
Combination Oil and Charcoal Absorption	5,402,530	5,936,129	1.099 "
Charcoal Absorption	1,106,587	114,147	.103 "
Drip	.....	12,807	.....
TOTALS	26,579,941	36,429,695	1.371 "
Finished Gasoline produced at plants			4,318 Bbls.

DISTRIBUTION		
Stocks first of month	.....	269,451 Bbl.
Production during month	.....	867,374 "
Quantity mixed with crude or unfinished oils	294,629 Bbl.	..... "
Used in blending at Refineries	451,095 "	..... "
Stocks end of month	280,561 "	..... "
Used at Plants, Shortage and Evaporation losses	12,429 "	..... "
Balance	98,111 "	..... "
TOTALS	1,136,825 Bbl.	1,136,825 Bbl.

STOCKS		
Natural-gas gasoline held by Natural gas Gasoline Plant Operators	1,398,784 Gal. or	33,304 Bbl.
Natural-gas gasoline held by Refiners	10,384,794 " "	247,257 "
TOTALS	11,783,578 Gal. or	280,561 Bbl.
Finished Gasoline (Motor Fuel) held by Natural-Gas Gasoline Plant Operators		194 Barrels

CORROSION IS SUBJECT OF NEW PUBLICATION

"Corrosion-Causes and Prevention" is the title of a new book by Frank N. Spoller, director of the metallurgical department of the National Tube Company. The book is published by the McGraw-Hill Book Co., Inc., of New York, and explains in detail the various phases of corrosion and its prevention.

GASOLINE PRODUCED IN NEW ENGLISH COAL DISTILLATION

Development of two new processes for the distillation of coal at low temperatures will permit England to produce domestically, as a by-product, more than $3,000,000,000 worth of automobile fuel and oil at present imported, it has been announced by the International Combustion Engineering Corporation of New York City.

A. P. I. RESOLVE MADE ON GAS CONSERVATION

In line with the recommendations of the Federal Oil Conservation Board the board of directors of the American Petroleum Institute assembled at the annual convention of that body at Tulsa, passed a resolution to the effect that the prevention of waste of gas is of paramount importance in conservation and economical production of oil. A committee of seven, headed by E. W. Marland, of the Marland Oil Company, Ponca City, Okla., as chairman, was appointed on Waste of Gas.

The recommendation of the Federal Oil Conservation Board on prevention of gas waste called for "legislation with the declared purpose of conservation to stop the waste of gas, the loss of its content of gasoline, and the even greater loss incident to reduction of gas pressure in the oil sands."

HYDROGEN SULPHIDE IS PANHANDLE GAS PROBLEM

One of the interesting problems of the natural gas industry in the Panhandle field of Texas is the considerable amount of hydrogen sulphide in the gas there. The hydrogen sulphide content in the gas from the stratum above the oil as well as that coming with the oil is asserted by the Bureau of Mines to be between .2 and .6 per cent by volume or from 126 to 378 grains per 100 cubic feet.

Removal of this corrosive and otherwise objectionable element, is practicable. Manufactured gas plants have solved the problem which is always before them. However, the methods used by manufacturers of gas are not altogether practicable with the great volume of natural gas from the Panhandle field and several new economical processes are being developed for the purification of this gas.

BRAUN FACTORY MAKES FOURTH EXPANSION IN FOUR YEARS

C. F. Braun & Co., manufacturing mechanical engineers, have just completed another large addition to their factory at Alhambra. This expansion is the fourth extension of the facilities of this growing organization since the company moved to Southern California from San Francisco less than four years ago. In that time the iron and brass foundries have been almost tripled, while the machine shops and assembly rooms have been approximately doubled in size and capacity.

New property has been recently acquired on which the company is constructing one of the largest and most modern steel foundries in the west.

LARAMIE, WYO., LABORATORY OF BUREAU OF MINES IN GAS STUDY

Some interesting work on natural gas is under way in the laboratory established at the University of Wyoming, Laramie, by the Bureau of Mines in 1924. One study which is under way deals with the Joule-Thompson effect on natural gas, or the amount of cooling produced by the expansion of gas through a porous plug. Efficient well flowing for the conservation of natural gas is also a subject of investigation, and the findings will materially further conservation efforts in Wyoming.

GASOLINE PLANT ENLARGED

A gasoline plant of 7,500 gallons daily capacity is to be erected in Wheeler County, Tex., by Frank Phelps. Another plant owned by the same operator is being increased in size from 5,000 gallon to 7,500 gallon capacity.

CAL-TEX GASOLINE COMPANY SELLS PLANTS

Natural gasoline plants of the Cal-Tex Gasoline Company located in the Panhandle area of Texas, have been sold to the Associated Producers Gasoline Company, according to late announcement.

NATURAL GAS BROUGHT TO STERLING, KANSAS

Sterling, Kan., will have natural gas as soon as the city distribution system is complete. The city light plant and other industrial consumers, as well as domestic users, will employ the new fuel.

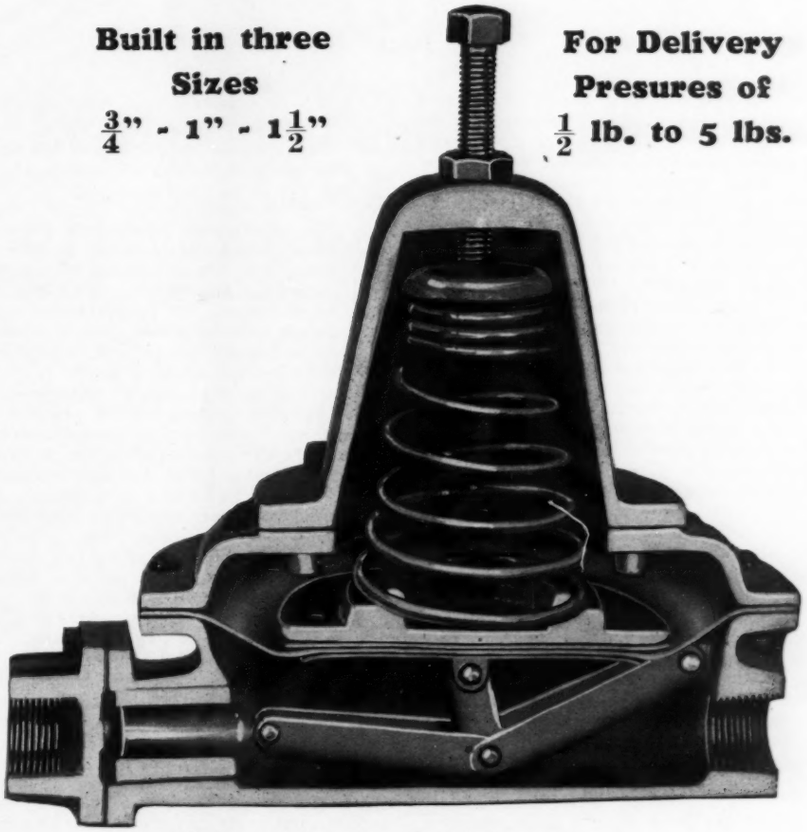
HUNTINGTON BEACH PLANT FOR O. C. FIELD CORP.

An absorption plant is being built by the O. C. Field Gasoline Corporation at Palm Ave. and 17th Street, Huntington Beach, the plant to have a 10,000 gallon capacity daily.

The Reliance High Pressure Regulator

Built in three Sizes
$\frac{3}{4}$" - 1" - 1$\frac{1}{2}$"

For Delivery Presures of
$\frac{1}{2}$ lb. to 5 lbs.



Particularly suitable for Industrial Plants where positive lockup, close regulation and large capacities are desired. Prices upon application

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PASADENA, CALIFORNIA

Eastern Representative	Northwestern Representative	Mid-Continent Representative
Isbell Porter Co.	Northwest Gas & Electric Equipment Co.	Westcott & Greis
Newark, N. J.	Portland, Oregon	Tulsa, Okla., Dallas, Texas

W P & S

DESIGNERS, FABRICATORS & ERECTORS OF PRODUCTS OF **STEEL**

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W P & S

Organizing *an* Entire Company *for* Customer Ownership Sales

(Continued from Page 25)

pects has sent to him, a carefully prepared advertising folder. Each customer on the company's book is also sent a folder with the subject presented in another way. Therefore, many prospects receive two folders. Several days prior to the campaign and all during the campaign, extensive newspaper advertising is carried on.

The company is organized into four teams designated as follows: *"Office," "New Business," "Shop" and "Plant."* Each employee is given a quota, the total of which constitutes the departmental quota. The quota given to each employee is less than the company really expects the employee to sell, but the psychology of having each employee exceed his quota is very helpful in the sale. Each morning during the sale each department head gets a report on the calls and sales from the members of his department.

STIMULATING SALES

To stimulate sales, commissions are given to the employees on every share sold as well as prizes offered for various accomplishments. In addition to that, a Henry L. Doherty loving cup is offered to the department which sells its quota the greatest number of times. It so happens that the Shop Department has won this cup four consecutive times. Any department that wins the cup three times is entitled to keep it permanently and then a new cup is offered. Much friendly rivalry exists between the various departments. Each time some department has been a very close runner-up for high honors

The following is a list of prizes offered for various accomplishments during each campaign:

CASH PRIZES

General company prizes

1. To the employee selling his or her quota the greatest number of times:
   $30.00—First Prize.
   20.00—Second Prize.
   10.00—Third Prize.
2. To the employee selling the greatest number of shares:
   $30.00—First Prize.
   20.00—Second Prize.
   10.00—Third Prize.
3. To the employee selling to the greatest number of "new name" customers:
   $30.00—First Prize.
   20.00—Second Prize.
   10.00—Third Prize.

Special Company Prizes

1. To the employee who sells his or her quota the most times up to midnight of the third day, Tuesday, September 14: $15.00. Signed subscriptions fully paid for must be turned in by 9 a. m., Wednesday, September 15, in order to count toward this prize. "Fully paid for" means cash with order or first payment on partial payment plan.
2. To the employee who sells the greatest number of shares up to midnight of the third day, Wednesday, September 15: $15.00. Signed subscriptions fully paid for must be turned in by 9 a. m., Thursday, September 16, in order to count toward this prize.
3. To the lady employee selling her quota the greatest number of times: $15.00.

Departmental prize

1. The department which sells its combined quota the greatest number of times will win possession of the new Henry L. Doherty Cup. This cup will be competed for in successive campaigns until it is first won three times by some one department, which will then retain it permanently.

In each of the four ten-day employee sales which we have conducted, 86 per cent of the 102 employees have made sales and in some of the departments all of the employees have made sales. The average number of shares of $100 par value each month. We campaign is thirteen, and his average shares per sale were a little over three.

The following analysis of the four ten-day sales will be of interest, I am sure, because it shows the distribution of shares per sale.

During the past two years the Full Time Department has been averaging about 600 shares of $100 par value each month. We have had long enough experience with this activity to absolutely determine the value of it. We feel very confident that our public relations have been decidedly improved by this activity and in addition to that, the morale of the company's employees has been decidedly improved, which is shown by more interest and pride in their work. This is by no means the least important accomplishment of customer ownership activities.

DRY GAS TRANSMISSION PERMIT GIVEN SOUTHERN COUNTIES

Exclusive franchise to pipe dry gas to drilling rigs east of 17th Street, Huntington Beach, Calif., has been given the Southern Counties Gas Company, the company agreeing to pay the city 1-¼ cents per thousand cu. ft. sold. Richfield Oil Company and the Ahlburg Gasoline Company were given permission to lay wet gas lines.

ALPHA-LUX OPENS PLANT IN PHILADEPHIA

On January 1, the Alpha-Lux Co., Inc., of New York opened a plant in Philadelphia, the new plant covering about 25,000 sq. feet, and being equipped to handle the company's ready-mixed "Lux Sponge." The company's head office remains at 192 Front St., New York.

PORTLAND GAS & COKE OPENS OFFICE AT HILLSBORO

A branch store of the Portland Gas & Coke Company has been established in the Washington Hotel building, at Hillsboro, Ore. Gas street lights installed outside the store added much to the brilliancy of the opening night, December 1.

GAS IN MODEL HOME AT ALTUS, OKLAHOMA

The Southwestern Gas & Fuel Company participated in the opening of a model home in Altus, Okla., recently. Gas for cooking and heating is supplied this Home Beautiful.

COMMISSION OVERRULES FREE GAS CLAUSE

A provision in a public utility franchise that imposes upon the company a duty to supply free service to the municipality is, of course, a burden upon rate payers in excess of their fair share of the cost of service. It operates to collect from rate payers a charge that properly should be borne by the taxpayers of the municipality.

In the case of the Western Oklahoma Gas and Fuel Company against the city of Duncan the Supreme Court of Oklahoma on November 23 upheld on order of the Corporation Commission setting aside a provision of the franchise under which the company was required to furnish gas free to light and heat the city hall of Duncan. In this case the Supreme Court reversed the District Court of Stephens County which had upheld the provisions of the franchise.

FUNERAL AID ASSOCIATION OF B. C. ELECTRIC GROWING

An increase of 170 members in the funeral aid association of the British Columbia Electric Railway Company resulted from the first week of a campaign recently conducted. Those in the association pay a $1.00 entrance fee, $1.00 a year to the reserve fund, and $1.00 upon the death of any member of the organization.

NEW REPAIR SHOP BUILDING FOR SOUTHERN COUNTIES

Southern Counties Gas Company has a repair shop under construction at 3132 Atlantic Street, Los Angeles, for the repair of regulators and iron case meters. The shop is of one-story construction, 25 feet by 190 feet in dimension, and will be complete some time early in January.

VENTURA GASOLINE PLANT IS DOUBLED IN CAPACITY

The Standard Gasoline Company is doubling the capacity of its Ventura No. 4 plant, which will contain eight absorbers when complete. Gas will be handled under well pressure.

BATON ROUGE UTILITY HAS NEW MANAGER

M. C. Smith is now manager of the Baton Rouge, La., Electric Company, which distributes gas in that community. The managership was rendered vacant by the death of Alves Dixon, former manager.

TRI-CITIES GAS CO. OPENS STEPHENVILLE OFFICE

The Stephenville, Tex., headquarters office of the Tri-Cities Gas Company has been formally opened. The company serves the communities of DeLeon, Comanche, Dublin, and Stephenville.

ONE-TENTH OF U. S. NATURAL GAS IN TEXAS

Texas produces about one hundred billion cubic feet of natural gas a year—approximately one-tenth of the United States production.

ELECTRA GAS COMPANY SOLD TO COMMUNITY GAS CO.

The Electra Gas Company, Electra, Tex., has been purchaesd by the Community Gas Company, which serves five other towns in that vicinity.

ASK FOR GAS FRANCHISE IN PORT ANGELUS, WASH.

A fifty-year franchise and the right to lay mains within the city of Port Angelus, Wash., has been applied for with the city commission by C. A. Strong, of Tacoma.

TWIN CITY GAS CO. REDUCES RATES TO $2.00 PER MCF

Joseph M. Berkley, president of the Twin Cities Gas Company, serving Beaumont, Banning, Hemet and San Jacinto, Calif., announces a cut in gas rate to $2.00 per thousand cubic ftee, made voluntarily by his company. The new rate was effective just before the first of the year.

During 1927, according to Mr. Berkley, the company expects to introduce natural gas service, four high-pressure storage tanks now being in process of construction at Beaumont.

SAN ANTONIO GAS SUPPLY TO BE INCREASED

A new natural gas main under construction between D'Hanis and the lines of the Southern Natural Gas Company will give San Antonio, Tex., a considerably increased natural gas supply. The producing company is furnishing gas to the San Antonio Public Service Company. Western Gas and Fuel Company is constructing the line.

P. G. & E. TAKES OVER GAS SYSTEM IN SANTA CLARA

Title to the gas properties of the municipal gas department of Santa Clara, Calif., was officially transferred to the Pacific Gas and Electric Company on December 27 by the Santa Clara trustees. The consideration paid the municipality was $50,000. Santa Clara business will be handled through the company's San Jose office. Application of P. G. and E. rates will bring a saving estimated at $10,000 annually to Santa Clara users, and $100,000 will be spent by the company over a two year period in service extensions and repairs.

RIO GRANDE VALLEY GAS CO. TO SERVE BROWNSVILLE

Permission to lay lines for domestic gas service in Brownsville, Tex., has been granted the Rio Grande Valley Gas Company. The same company will serve San Benito and a number of other communities in the same valley.

AGNEW, CALIF., TO BE ON GAS LINES OF P. G. & E.

The Pacific Gas & Electric Company is to extend its service to include the town of Agnew, Calif., new mains in that town to cost about $2,280.

COMPLETE 33-MILE LINE TO REFINERY AT PARCO, WYO.

A 33-mile natural gas line has been completed between the Mahoney Dome fields and the refinery of the Producers & Refiners Corporation at Parco, near Rawlins, Wyo. The line, which was built by the Hope Engineering Company, is fed by three gathering lines and has a supply of about 18,000,000 cu. ft.

LARGE INDUSTRIAL USER ON HOUSTON COMPANY'S LINES

The Houston Pipeline Company is connecting a large industrial gas user to its lines. The Stauffer Chemical Company plant, in the east part of Houston, Texas, is the new consumer, and has been using crude oil as fuel.

McCABE NEW VICE PRESIDENT OF MUNICIPAL GAS CO.

James B. McCabe of Dallas, Tex., has been elected vice-president of the Municipal Gas Company. Mr. McCabe will continue as general manager of the utility.

The

Everlasting Paint & Sales Co.

Announces the Hunt Process of Curing Concrete using "McEverlast" Protective Coatings

The Hunt process of curing concrete is fully protected legally. It is a process whereby a perfect internal cure is effected. It is not an ad-mixture.

The application of all "McEverlast" when used in The Hunt Process will be under the direct supervision of competent engineers.

Complete technical information on this process is now being prepared for distribution.

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ALUNDUM—CRYSTOLON

Heavy Duty Refractories

For All High Temperature Uses

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Gas Regulator Company

Manufacturers
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Gas Regulators and Governors

Holder Governors
Single District Station Regulators
Double District Station Regulators
High Pressure Service Regulators
Low Pressure Service Regulators
High Pressure Line Regulators
Intermediate Pressure Governors
Relief & Back Pressure Valves
Anti-Vacuum Quick Closing Valves
Separate Mercury Seals

Main Office and Factory *Anderson, Indiana*

Established 1892

Just a wonderful Holiday season and a healthful, prosperous New Year is our sincere wish for everyone.

And may we express a word of gratitude to those who have availed themselves of our good equipment and engineering service!

JENSEN INSTRUMENT COMPANY

443 SO. SAN PEDRO ST. LOS ANGELES, CALIF.

THERE IS A
PABCO PRODUCT
TO PROTECT
EVERY SURFACE

The Paraffine Companies, Inc.

San Francisco Oakland Los Angeles Seattle Portland

NATURAL GAS MANUAL FOR THE HOME

Working in conjunction with the Natural Gas Association of America, the U. S. Bureau of Mines, several years ago, prepared a "Natural Gas Manual for the Home." Through the general offices of the Natural Gas Association at Pittsburgh, Pa., 400,000 copies of the manual were distributed in various communities of the United States where natural gas is the principal fuel.

It is suggested that in communities where natural gas has recently been introduced these pamphlets could be distributed directly to the homes or through the schools. Nine thousand copies of the manual are available and can be supplied at a price of 3½ cents each.

SO. COUNTIES SALES MEETING HAS BIG ATTENDANCE

Thirty-seven sales representatives and district managers of the Southern Counties Gas Company attended a dinner meeting of December 16 in which were combined a sales meeting and a Christmas party. A. F. Bridge, executive engineer of the company, spoke on merchandising problems; Fred Champion, fuel engineer, spoke on gas refrigeration; Sidney Ledbetter of the Santa Monica sales staff gave a sales talk, demonstrating on a Roper gas range. The meeting was in charge of Clyde H. Potter of the company's advertising and commercial department.

METTLER COMPANY BURNERS REPLACE OIL EQUIPMENT

The Lee B. Mettler Company of Los Angeles, manufacturers of gas burners, have just furnished their Entrained Combustion Gas Burners for the converting of oil-fired boilers to gas at the Freeport Sulphur Company, Freeport, Texas.

MARMARTH, N. D. GIVES FRANCHISE TO NATURAL GAS OPERATOR

The town of Marmarth, North Dakota, has granted a franchise for natural gas service to Oakley Currey of Chicago, gas to be piped from the Marmarth-Baker field southwest of the community, and work to begin next spring.

SHAWNEE, OKLA., CITIZENS CONSIDER GAS QUESTION

Shawnee, Okla., is considering the question of gas franchises. A petition is being circulated in the community to determine whether a franchise for natural gas service shall be granted to a Tulsa operator.

ANNUAL DINNER PLANNED FOR SO. CAL. 5-YEAR MEN

On January 15 will be held the annual employees' dinner for those who have been with the Southern California Gas Company five years or more.

MINNEAPOLIS HEAT REGULATOR CO. BUILDS NEW HOME

Plans for the new factory building of the Minneapolis Heat Regulator Company, a six-story structure which will cost about $300,000, are completed and construction is under way.

PAPER FOR GAS BILLS IS BIG COST ITEM

In order to supply its customers with monthly gas bills for one year, one of the largest gas companies in the middle west uses 600 reams of white paper, each ream weighing 90½ pounds. The total weight of this paper is more than 54,000 pounds, or 27 tons.

Solving Heating Problem *for* Hatcheries

(Continued from Page 23)

After the chicks are hatched, they must be provided with warm quarters until they no longer require artificial heat. For brooding chicks, gas is incomparably the best and most economical fuel. In Southern California it is generally utilized in heaters of the "colony" type; these consist simply of a flat sheet metal cone supported a short distance above the floor with a circular gas burner underneath; thermostatic control may or may not be provided. These heaters furnish a warm zone beneath, and in addition temper the air in the brooder house so that the chicks are not subject to a sudden change of temperature when they leave the hover on cold days. Electric brooder stoves, in order to conserve an essentially expensive source of heat, are enclosed, and in cool weather are much warmer and more moist than the surrounding air—a condition which may result in the chilling and consequent loss of many chicks. Distillate or kerosene brooder heaters are inconvenient, expensive to operate, and are likely to be blown out in windy weather by back-drafts in the vent pipes

From the standpoint of the gas utility, poultry incubating and brooding constitute a very desirable load. Operations are carried on continuously throughout nine months of the year, and in the case of incubating, twenty-four hours per day. Gas equipment is generally very simple, and is less expensive to install and operate than either electric or kerosene. This should enable gas companies to obtain and hold the business of supplying this rapidly growing industry, which has doubled in output within a very few years.

MONTANA COMPANY APPLIES TO SERVE BLACK EAGLE

A. H. Sikes, manager of the Great Falls Gas Company, Great Falls, Mont., has made application with the supervisors of Cascade county, in which Great Falls lies, to extend the service of his company to Black Eagle.

PLANT DUE AT TRINIDAD FOR MOUNTAIN STATES OIL CORP.

At a cost of $75,000 the Mountain States Oil Corporation will erect a gasoline absorption plant near Trinidad, Colo., at Barela. The plant will treat gas from the company's Malonada ranch, well which is flowing about 1,000,000 cu. ft. daily. Construction of other gasoline plants is also planned by the company.

E. H. COTTON ADVANCED

E. H. Cotton has been appointed assistant gas engineer of the Northern States Power Company, Minneapolis, Minn. He was formerly superintendent of production of the company's St. Paul division.

B. C. ELECTRIC WANTS RENEWAL

The British Columbia Electric Railway Company has applied to the city council of New Westminster, B. C. for a renewal of franchise. The company's request carries with it offer of rate reductions.

HONOLULU COMPANY EXHIBITS APPLIANCES AT FAIR

At the Territorial Fair held recently in Honolulu the Honolulu Gas Company, Ltd., maintained a prominent exhibit in which were shown a Humphrey Rotisserie, water heaters and ranges. This was the first showing of the Rotisserie in Honolulu and the display created a great deal of interest.

Pioneer

PIPE COVERING

is the best form of Pipe Line Insurance you can buy at any price!

Whether your pipe line be buried or exposed... you will find Pioneer asphalt-saturated fabric pipe wrapping will add years of service and money value all out of proportion to its cost. Pipe wrapping pays for itself, and then pays dividends.

PIONEER PAPER CO., *Inc.*

Established 1888

LOS ANGELES SAN FRANCISCO

PORTLAND SEATTLE

DENVER

Pioneer manufactures a complete line of Roofings and Building Papers

G	Automatic	O	P	M	E	Back Pressure Valves
O	Balance	X	U	A	Q	Boosters
V	High and Low		R	T	U	Photometers
E	Pressure	I	I	E	I	Unison Telemetric Gauge
R	District	D	F	R	P	Gas Timers
N	Reverse Flow		Y	I	M	Gauges
O	Fuel Gas	E	I	A	E	Street Department Tools
R	Service		N	L	N	Gas Tape
S	Special	S	G	S	T	Miller Packing

Connelly Iron Sponge & Governor Co.

New York San Francisco Chicago

Are you including
Minneapolis Controls in every heating installation?

The "MINNEAPOLIS" HEAT REGULATOR

The heart of the heating plant

Minneapolis is the proven control. National advertising makes it easy to sell. You are giving your customer the best there is and making additional profit for yourself. This means more satisfaction all around.

Arthur F. Erickson Co.

Pacific Coast Distributors

SELLING BUILDING
PORTLAND, OREGON

Branches or Dealer stocks in principal Pacific Coast cities

New Process *for* Removal *of* Sulphur

(Continued from Page 21)

lime sulphur solutions. One consists in drying the paste with steam up to pressures of 40 to 50 pounds, the other consists in melting in a closed retort. The first yields a granular, sand black product. The second, a black dense cake. About seven hundred tons of this crude product have been sold.

CONSUMERS WILL BENEFIT

Our gas consumers also may eventually derive a direct benefit from the application of this process. Further improvements may make it possible to use lower grade fuels than gas companies have been able to employ so far. There are coals in California which, were it not for their sulphur content, could be used for gas manufacture. There are also certain oils high in sulphur content which have not been used but which with the depletion of the oil may have to be resorted to. As the general fuel situation continues toward higher prices, the gas companies will be prepared to use lower and lower grade materials while still furnishing to the public an ideal commodity without proportionate increase in rates.

There is a multitude of industries in which sulphur is used and many of them use sulphur by burning. However, this by-product is not adapted for this purpose because it does not burn freely and it is not worthy of special effort to prepare this material for such use, since the cheapest form of sulphur will satisfy in most of these cases. It is the fine division of this by-product in its present form, that should be utilized. For instance, the rubber industry requires a finely divided sulphur. The elasticity and the wearing qualities of their products are dependent upon the fineness of the ingredients. However, it is also important for their purpose that small traces of water be removed but this problem has not as yet, been solved.

The fact that this sulphur is readily wettable is an asset for many purposes, such as, the preparation of pastes, suspensions and solutions. It can be dried sufficiently for the preparation of dusting powders and still retain the property of being readily taken into liquid suspension. This same property, however, makes complete drying a difficult matter. It is not probable that it will be necessary to prepare this sulphur in such a variety of dryness. The results from the practical tests in the field will no doubt, show for which purpose it can be most economically prepared but, until that time, the search for new uses and other means of refining will be continued.

USE OF GAS ABOLISHES THE BAKING BURDEN

In large cities where gas is available for use in large central baking establishments, less than forty per cent of the women are obliged to do their own baking today, according to figures supplied by the Agricultural Publishers Association. This is largely owing to the fact that the modern bakery using gas can supply bread as nutritious and tasteful as "mother had to bake" with a gas consumption of only three-quarters of a cubic foot per pound of bread.

In rural communities and small towns where gas often cannot be obtained, more than ninety per cent of the women are still compelled to spend many hours a week in their kitchens preparing the family bread supply. In villages and towns under 5,000 population approximately seventy-five per cent of the women still do their own baking, and in small cities of 5,000 to 25,000 population the percentage is only slightly less.

CARBONIZATION OF UTAH COALS UNDER INVESTIGATION

An investigation to determine the distillation products of low-temperature corbanization of Utah coals at various temperatures and under different conditions will be undertaken by the Bureau of Mines, Department of Commerce, at its Pittsburgh experiment station. The following conditions will be studied: distillation in atmosphere of superheated steam, in atmosphere of preheated natural gas, in atmosphere of products of combustion of natural gas, and distillation by external heating retort.

Another investigation has as its object the determination of the identity and amount of the major constituents of the oil vapors in the gas and of the tar from low temperature carbonization of coal.

GREENVILLE GAS SYSTEM HAS $200,000 ADDITION

Manager E. P. Griffin of the Community Natural Gas Company, Greenville, Tex., announces that his company will install a new system of gas mains in the south part of this community, the project involving about $200,000.

DISCARD THE BURGLAR ALARM!

We've heard of many a use for gas, but this one beats us. In Salt Lake City a gas user claims his automatic gas furnace frightened off a marauding burglar.

Charles Matthews is now manager of the Independent Gas and Oil Company's plant at Arco, Idaho.

FIRE BRICK

THROUGHOUT the West, the Gas Industries are depending on the Fire Brick service of this pioneer organization. Standard sizes for—

LININGS — CHECKERS
BOILER SETTINGS

are carried in stock for quick shipment. If special or hand-made shapes are required, our plant is especially well equipped to make them.

Fire Clay, Hollow Tile—all clay products used by the Gas Industry—are included in our service.

Write or phone us for complete information.

LOS ANGELES
PRESSED BRICK CO
GLADDING, McBEAN & CO
621 So Hope St Trinity 5761
LOS ANGELES

284

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

Help Wanted

Wanted—Experienced crew foreman for street department of Gas Company in northwestern city. Answer in own handwriting giving age, experience, reference and salary expected. Box A-4 *Western Gas.*

Situations Wanted

Note: Western Gas will publish free of charge, under this heading, advertisements of situations wanted. Maximum length, 50 words; additional space at classified rates five cents per word per insertion. Copy should be neatly typewritten on one side of paper only, and should be mailed to reach *Western Gas* not later than the 20th day of the month prior to publication date.

Wanted—Employment on the Pacific Coast by man from Mid-Continent Field. Experience installing and managing city distribution plants, and general line work. Last position paid $200.00 and expenses which I resigned due to family sickness. Box A-2 *Western Gas.*

Heating Engineer—39 with 25 years experience in warm air heating in all its branches, mfg. heaters, lay out work, figure jobs, handle men and shop, install work and sell to the public. At present employed but want better and permanent opening with chances for advancement. Will start at $250.00. Have several good gas heater patents. Box A-1 *Western Gas.*.

Chemical Engineering Graduate—28, with five year's experience, covering all branches of distribution work, wishes to change to a position offering greater opportunity for advancement. Now employed as estimator on main line construction work. Best of references. Box A-3, *Western Gas.*

Position as assistant superintendent of oil or gas pipe line wanted by young married man with eight years of varied experience and sterling references. At present employed but advancement and more lucrative salary desired. Thorough knowledge of construction and installation. Box A-5 *Western Gas.*

Sell your second hand machinery and equipment through a small classified advertisement in *Western Gas.* It costs but five cents per word or $2.00 per issue.

EMPORIA, KAN., SOON TO HAVE NATURAL GAS SERVICE

A pipe line from the Lipps field to Emporia, Kan., is expected to reach the community, and natural gas service to begin, by February 1, if present rate of progress continues on the line.

Corrosion, the destructive and costly enemy of your pipe lines, is effectively balked by the thick protective coating made by one application of Eclipse Save-A-Line to the pipe surface.

This extra thick film ,reinforced with asbestos fibre, elastic and enduring, protects for many years against the corrosive action of soils caused by moisture, lime, alkali or electrolysis. The life of thousands of miles of pipe line has been extended by the protecting film of Save-A-Line.

It can be applied without heating and by inexperienced labor. Only one application necessary.

Let us know your requirements. We will be glad to send you sample and quote you prices. If you have any particular difficulties peculiar to your soil or climate, our Service Department is at your disposal.

A Few of the Larger Users of Save-A-Line

The Shell Company
Lone Star Gas Company
Humble Pipe Line Company
The Gulf Pipe Line Company
Associated Pipe Line Company
California Petroleum Co.

The Eclipse Paint & Mfg. Co.

Cleveland, Ohio, U. S. A.

Dallas **Detroit** **Philadelphia** **San Francisco**
Denver **Newark** **Pittsburgh** **Charlotte, N. C.**

WESTERN GAS
626 South Spring Street,
Los Angeles, California

Starting with the next monthly issue, you may send WESTERN GAS to the undersigned. Upon receipt of invoice, remittance will be sent to cover (1 year $2.00) or (3 years $5.00).

Name ..... *Title* .....

Company .....

Address .....

City and State .....

Please Check

[ ] GAS COMPANY [ ] GAS APPLIANCES
[ ] NATURAL GASOLINE CO. [ ] MISCELLANEOUS

Subscription: 1 Year, $2.00; 3 Years, $5.00, in Advance

A WESTERN GUIDE to INDUSTRIAL PURCHASING

Readers interested in any articles not listed in these pages are cordially invited to advise *Western Gas* of their wants and every effort will be made to furnish a list of the proper manufacturers. Addresses of companies listed on these pages may be found by consulting their advertisements in this issue.

Absorption and Compression Plant Equipment
Baker Iron Works.
C. F. Braun & Co.
Chaplin-Fulton Mfg. Co.
J. A. Campbell.
Jensen Instrument Co.
Southwestern Engineering Corp.
The E. A. Key Company
Western Pipe & Steel Co.

Absorption Towers
Baker Iron Works.
C. F. Braun & Co.
J. A. Campbell.
S. Herbert Lanyon
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Abrasives
Abrasive Engineering Corp'n.

Acetylene, Dissolved
Commercial Acetylene Co.

Acid Resisting Iron
Pacific Foundry Company.

Adjustable Plugs
Lattimer-Stevens Co.
Western Pipe & Steel Co.

Agitators
Baker Iron Works.
Western Pipe & Steel Co.

Aluminum Bronze Powder for Paint
Hill, Hubbell & Co.
The Paraffine Co.s, Inc.

Analyzers
C. F Braun & Co.
Smith-Emery Co.

Annealers (Bar, Blank, Strip)
Pacific Meter Works.

Anti-Fluctuators
Pacific Meter Works.

Apparatus, Experimental Gas
The Alpha-Lux Co., Inc.
Metric Metal Works.
Pacific Meter Works.

Appraisals and Valuations
Smith-Emery Co.

Aqua Ammonia Apparatus
Steere Engineering Co.

Automobile Tires
Truck Tire Service Co.

Bags, Gas Main
Connelly Iron Sponge & Governor Co.
Mueller Co.
Safety Gas Main Stopper Co.

Barometers
Jensen Instrument Co.
Westcott & Greis, Inc.

Belting
Smith, Booth, Usher Co.

Bench Iron Work
General Gas Light Co.

Benzol, Recovery Apparatus
Steere Engineering Co.

Bins, Storage (ash, coal, coke)
Steere Engineering Co.

Blast Gates
Montague Pipe & Steel Co.
Steere Engineering Co.

Blocks and Tiles, Fire Clay
The Alpha-Lux Co., Inc.
American Refractories Co.
Los Angeles Pressed Brick Co.
Steere Engineering Co.
Stockton Fire Brick Co.
S. Herbert Lanyon.

Blowers and Boosters
Ingersoll-Rand Co.

Blowpipes
Montague Pipe & Steel Co.

Boiler—Brickwork
J. N. J. Firebrick Co.

Boiler Equipment
E. A. Key Co.

Boiler Settings, Pipe and Boiler Insulation

Boiler Maker's Tools
E. A. Key Co.

Boilers
Baker Iron Works.
Montague Pipe & Steel Co.
Smith, Booth, Usher Co.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Boilers, Gas-Fired
Baker Iron Works.
Montague Pipe & Steel Co.
Smith, Booth, Usher Co.

Boiler Settings, Pipe and Boiler Insulation
S. Herbert Lanyon.
Pioneer Paper Company.
J. J. Thorpe & Son, Inc.

Boilers, Waste Heat
Baker Iron Works.

Boilers, Water Tube
Baker Iron Works.
Montague Pipe & Steel Co.
Smith, Booth, Usher Co.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Boxes
Baker Iron Works.
Gas Furnace Association.
Steere Engineering Co.

Brass (rods, sheets, tubes, wire)
Mueller Co.

Breakers
Ingersoll-Rand Co.

Breeching (Boiler and Stack)
Western Pipe & Steel Co.

Brick, Firebrick
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
Los Angeles Pressed Brick Co.
S. Herbert Lanyon.
J. J. Thorpe & Son, Inc.
Steere Engineering Co.
Stockton Fire Brick Co.

Brick, Firebrick—Installation
J. N. J. Firebrick Co.

Brushes, Wire Pneumatic
Abrasive Engineering Corp'n.
Ingersoll-Rand Co.

Buildings, Steel
Baker Iron Works.
Western Pipe & Steel Co.

Bunkers, Steel and Concrete
Western Pipe & Steel Co.

Burners
Gas Furnace Association.
General Gas Light Co.
S. Herbert Lanyon.
Lee B. Mettler.
Montague Pipe & Steel Co.
Payne Furnace & Supply Co.
Rotary Manufacturing Co.
J. J. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Burners—Gas
Lee B. Mettler

Burners, High Pressure
S. Herbert Lanyon.
Lee B. Mettler.
Rotary Manufacturing Co.

Burners, Low Pressure
Gas Furnace Association.
General Gas Light Co.
S. Herbert Lanyon.
Lee B. Mettler.
Payne Furnace & Supply Co.
Rotary Manufacturing Co.

Burners—Oil
Rotary Manufacturing Co.

By-product Recovery Apparatus
Oliver Continuous Filter Co.
Steere Engineering Co.

Calorimeter Accessories
Metric Metal Works.
Pacific Meter Works.

Calorimeters
The Alpha-Lux Co., Inc.
Metric Metal Works.
Pacific Meter Works.

Cases, Meter
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.

Casinghead, Gas Meters
Jensen Instrument Co.
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.

Casing and Tubing (steel)
Montague Pipe & Steel Co.
Smith, Booth, Usher Co.
Steere Engineering Co.

Casing, Wrought Iron
Smith, Booth, Usher Co.

Casing—Iron
South Chester Tube Company

Casing—Steel
South Chester Tube Company

Cast Iron Pipe
Smith, Booth, Usher Co.
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Castings
Pacific Foundry Company.
Philadelphia Steel & Iron Co.
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Cement
Abrasive Engineering Corp'n.
Stockton Fire Brick Co.

Cement, High Temperature
Stockton Fire Brick Co.

Cement—Plastic
Pioneer Paper Company.

Centrifugal Pipe
United States Cast Iron Pipe and Foundry Co.

Charging Machines (retort, etc.)
Steere Engineering Co.

Checker Brick
Abrasive Engineering Corp'n.
American Refractories Co.
Los Angeles Pressed Brick Co.
Steere Engineering Co.
Stockton Fire Brick Co.

Chemical and Gas Testing Apparatus
The Alpha-Lux Co., Inc.
Pacific Meter Works.
Westcott & Greis, Inc.

Chemists, Analytical
Smith-Emery Co.

Chimneys, Radial Brick
American Refractories Co.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.
J. J. Thorpe & Son, Inc.

Chimneys, Radial Brick Installation
J. N. J. Firebrick Co.

Chutes (coal, coke, ash)
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Clamps and Sleeves, Pipe
Mueller Co.

Clamps, Service
Mueller Co.

Cleaners, Service
Pacific Meter Works.

Coal Gas Plants
Steere Engineering Co.

Coal Tar Products and Chemicals
The Paraffine Co.s, Inc.

Cocks
Lattimer-Stevens Co.
Merco Nordstrom Valve Co.
Mueller Co.
Geo. D. Roper Corporation.

Coils and Bends
Philadelphia Steel & Iron Co.

Collectors, Dust
Western Pipe & Steel Co.
Steere Engineering Co.

Compressors
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Smith, Booth, Usher Co.

Compressors, Air
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Oliver Continuous Filter Co.
Robertson & Company.
Smith, Booth, Usher Co.

Compressors, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Smith, Booth, Usher Co.

Compressors, High Pressure
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, Portable
Ingersoll-Rand Co.
Robertson & Company.
Smith, Booth, Usher Co.

Condensers
Baker Iron Works.
C. F. Braun & Co.
Ingersoll-Rand Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.

Condenser Boxes
Baker Iron Works.

Condenser Tubes
Steere Engineering Co.

Cooling Systems, Towers
C. F. Braun & Co.
Steere Engineering Co.
Southwestern Engineering Corp.

Connections and Seals, Meter
Pacific Meter Works.

Controllers
Jensen Instrument Co.
The Foxboro Co., Inc.

Controlling Devices, Electric
Gas Furnace Association.
L. R. Teeple Co.

Controls, Air and Steam
Jensen Instrument Co.
S. Herbert Lanyon.
C. F. Braun & Co.
The Foxboro Co., Inc.
S. Herbert Lanyon.
Steere Engineering Co.
L. R. Teeple Co.

Cooling Systems
S. Herbert Lanyon.
Steere Engineering Co.

Cooling Towers
C. F. Braun & Co.
J. B. Gill Corporation.
Southwestern Engineering Corp.
Steere Engineering Co.

Counters, Revolution
Jensen Instrument Co.

Couplings
Pittsburgh Meter Co.

Coverings (Tank, Boiler, Cold and Steam Pipe)
The Paraffine Co.s, Inc.
Pioneer Paper Company.

Cubic Foot Bottle
Metric Metal Works.
Pacific Meter Works.

Cutters, Pavement
Ingersoll-Rand Co.
Robertson & Company.

Cutters, Pavement
Ingersoll-Rand Co.

Cylinders, Compressor
The C. & G. Cooper Co.
Steere Engineering Co.

Dephlegmaters
C. F. Braun & Co.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Diaphragms, Meter
Chaplin-Fulton Mfg. Co.
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.

Diggers, Clay
Ingersoll-Rand Co.
Robertson & Company.

Discharging Machines (retort, etc.)
Steere Engineering Co.

Displacement System, Tar
Steere Engineering Co.

Ditcher
Robertson & Company.
Smith, Booth, Usher Co.

Door, Clean-out
Baker Iron Works.
Steere Engineering Co.

Drills
Ingersoll-Rand Co.
Mueller Co.

Drill Pipe—Iron
South Chester Tube Company

Drill Pipe—Steel
South Chester Tube Company

Dryers
Payne Furnace & Supply Co.

Elevators
Baker Iron Works.

Engineers and Engineering Service
J. B. Gill Corporation.
Smith-Emery Co.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Engines
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Western Machinery Co.

Engines, Diesel
The C. & G. Cooper Co.
Smith, Booth, Usher Co.
Western Machinery Co.

Engines, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Smith, Booth, Usher Co.
Western Machinery Co.

Engines, Oil
The C. & G. Cooper Co.
Ingersoll-Rand Co.
Western Machinery Co.

Engines, Steam
Ingersoll-Rand Co.

Evaporating Apparatus
C. F. Braun & Co.
United States Cast Iron Pipe and Foundry Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.

Excavators, Ditch and Trench
Robertson & Company.
Smith, Booth, Usher Co.

Exchangers, Heat
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.

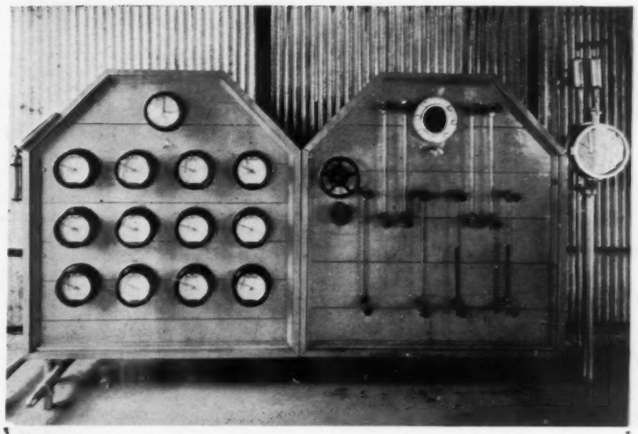
Sprague Meters

Represent
Twenty-five Years of
Progress

We Are Proud of
Our Service to
the West

Sprague Meter Co.

Los Angeles, California
San Francisco, California



Instrument Board, Manhattan Refining Co., Cassody, Kansas

There Is Nothing Unusual About This Instrument Board

The Manhattan Refining Co., Cassody, Kansas, is just another example of the growing number of plants which are 100% Foxboro equipped. In the photograph above only fourteen of the Foxboro Instruments installed in this natural gasoline plant are shown.

Refining companies all over the world find that with FOXBORO INSTRUMENT CONTROL gasoline yield is invariably high. On cracking stills, knock-out boxes, dephlegmators, fractionating towers, condensers, wax heaters, storage tanks, in fact, for every critical process there is a Foxboro Instrument for indicating recording and controlling the temperature, pressure, humidity or flow.

All Foxboro Instruments are guaranteed permanent in calibration and are accurate to within less than 1 per cent of total scale range. They have proved themselves ideally adapted to refinery work.

Foxboro Instruments are backed by a national sales engineering organization. Service stations are located at Tulsa, Los Angeles, San Francisco, Pittsburgh and Foxboro. Instrument Users located within 200 miles of these points are now getting 24 hours' service.

THE FOXBORO CO., *Inc.*
Neponset Avenue, Foxboro, Mass., U. S. A.

WESTERN OFFICES
Los Angeles, 443 San Pedro St. San Francisco, 461 Market St.
Portland, Ore., 816 Lewis Bldg.

New York Chicago Philadelphia Pittsburgh
Detroit Boston Atlanta Tulsa Cleveland

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Exhausters
Ingersoll-Rand Co.
S. Herbert Lanyon.
United States Cast Iron Pipe and Foundry Co.

Experimental Apparatus
S. Herbert Lanyon.
Metric Metal Works.
Pacific Meter Works.

Extractors
Steere Engineering Co.

Extinguishers, Fire
American La France Fire Engine Co.

Fans
Gas Furnace Association.
Smith, Booth, Usher Co.

Faucets, Drain
Mueller Co.

Felt—Deadening
Pioneer Paper Company.

Filters
S. Herbert Lanyon.
Oliver Continuous Filter Co.
Smith, Booth, Usher Co.
United States Cast Iron Pipe and Foundry Co.

Fire Clay and Products
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.

Fire Brick Contractors
J. J. Thorpe & Son, Inc.
Stockton Fire Brick Co.

First Aid Equipment
American La France Fire Engine Co.

Fittings
Hoffman Supply Co.
Philadelphia Steel & Iron Co.
Smith, Booth, Usher Co.
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Fixtures, Lighting (Domes, Portables, etc.)
Welsbach Company.

Flashlights and Batteries
The Paraffine Co.s, Inc.

Feed Water Heaters
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.

Fire Brick
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.
Steere Engineering Co.

Flanges
Hoffman Supply Co.
Montague Pipe & Steel Co.
Philadelphia Steel & Iron Co.
Pittsburgh Meter Co.
Smith, Booth, Usher Co.
Steere Engineering Co.
Westcott & Greis, Inc.

Floodlights
S. Herbert Lanyon.

Flooring—Industrial
Pioneer Paper Company.

Floors
Steere Engineering Co.

Forged Steel Pipe Flanges
Philadelphia Steel & Iron Co.

Forgings
Baker Iron Works.
Philadelphia Steel & Iron Co.
Gas Furnace Association.
S. Herbert Lanyon.
Payne Furnace & Supply Co.
Potter Radiator Corporation.
Pacific Gas Heating Co.
Geo. D. Roper Corporation.
J. J. Thorpe & Son, Inc.

Furnaces, Floor
Electrogas Furnace Co.
Gas Furnace Association.
Payne Furnace & Supply Co.
Pacific Gas Heating Co.
Potter Radiator Corporation.

Furnaces, Lead Melting
Gas Furnace Association.
Mueller Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Gas Analysis Apparatus
Jensen Instrument Co.
Metric Metal Works.
Pacific Meter Works.
The Foxboro Co., Inc.

Gas Meter Stop Cocks and Valves
Lattimer-Stevens Co.

Gas Main Tapping & Drilling Machines
Mueller Co.

Gaskets
Pittsburgh Meter Co.
Safety Gas Main Stopper Co.
Smith, Booth, Usher Co.
Steere Engineering Co.
The E. A. Key Company

Gasket Compound
E. A. Key Co.

Gasometer
Pacific Meter Works.
Steere Engineering Co.

Gas Pipe Line Construction
Robertson & Company.
Steere Engineering Co.
Western Pipe & Steel Co.

Gauges
The Alpha-Lux Co., Inc.
Jensen Instrument Co.
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Steere Engineering Co.
Westcott & Greis, Inc.

Gauges, Steam
Jensen Instrument Co.
Smith, Booth, Usher Co.
Steere Engineering Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Gauges, U Type
Jensen Instrument Co.
Metric Metal Works.
Lee B. Mettler.
Pacific Meter Works.
Safety Gas Main Stopper Co.
Steere Engineering Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Generators, Acetylene
Commercial Acetylene Co.

Generators, Water Gas
Baker Iron Works.
Steere Engineering Co.

Glassware
Westcott & Gries, Inc.

Governors
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Pacific Meter Works.
Reynolds Gas Regulator Co.
Sprague Meter Co.
Steere Engineering Co.
Westcott & Greis, Inc.

Hammers
Ingersoll-Rand Co.

Hanger, Meter
Mueller Co.

Hangers, Iron and Steel
Baker Iron Works.
Philadelphia Steel & Iron Co.

Heaters
Baker Iron Works.
C. F. Braun & Co.
Gas Furnace Association.
General Gas Light Co.
S. Herbert Lanyon.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.
Welsbach Company.
John Wood Mfg. Co.

Heaters, Floor
Electrogas Furnace Co.
Gas Furnace Association.
General Gas Light Co.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Heaters, Wall
Gas Furnace Association.
General Gas Light Co.
Pacific Gas Heating Co.
Payne Furnace & Supply Co.
Potter Radiator Corporation.

Heat Exchangers
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Heat Interchangers
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Hoists
Ingersoll-Rand Co.
Pacific Foundry Company.
Smith, Booth, Usher Co.
Western Machinery Co.

Holders
Baker Iron Works.

Holders, High Pressure
Baker Iron Works.

Hoppers
Montague Pipe & Steel Co.

Hose, Air
Ingersoll-Rand Co.

Hot Plates
Geo. D. Roper Corporation.

Hygrometers
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Incinerators
Baker Iron Works.
S. Herbert Lanyon.
J. J. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Incinerator Brickwork
J. N. J. Firebrick Co.

Indicators
S. Herbert Lanyon.
Westcott & Greis, Inc.

Instruments (Measuring, Testing and Recording)
The Alpha-Lux Co., Inc.
Jensen Instrument Co.
Metric Metal Works.
Pacific Meter Works.
The Foxboro Co., Inc.
Steere Engineering Co.
Westcott & Greis, Inc.

Insulating Materials
Beacon Water Heater Co.
The Paraffine Co.s, Inc.
Pioneer Paper Company.
Stockton Fire Brick Co.

Kilns
J. J. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Kilns—Brickwork
J. N. J. Firebrick Co.

Laboratory (for testing fire brick, refractories, etc.)

Laboratory Supplies
Mueller Co.
S. Herbert Lanyon.
Westcott & Greis, Inc.

Ladles, Hot Metal
Mueller Co.
Philadelphia Steel & Iron Co.

Lamps
General Gas Light Co.
Welsbach Company.

Lighters
Tappan Stove Co.

Lighting Incidentals
Welsbach Company.

Line Pipe—Iron
South Chester Tube Company

Line Pipe—Steel
South Chester Tube Company

Linings—Brickwork
J. N. J. Firebrick Co.

Linings—Car
Pioneer Paper Company.

Lubricators
Smith, Booth, Usher Co.

Lux Material
The Alpha-Lux Co., Inc.

Machinery
Smith, Booth, Usher Co.
Steere Engineering Co.

Machines
Steere Engineering Co.

Main, Bags
Mueller Co.
Safety Gas Main Stopper Co.

Mains, Street
United States Cast Iron Pipe and Foundry Co.

Main, Stopper
Mueller Co.
Safety Gas Main Stopper Co.

Mantles, Gas Lighting
General Gas Light Co.
Welsbach Company.

Manometers
Jensen Instrument Co.
Lee B. Mettler.
Westcott & Greis, Inc.

Meter Seals
Lattimer-Stevens Co.

Meter Shelves
Lattimer-Stevens Co.

Meter Swivels and Caps
Lattimer-Stevens Co.

Meters
Jensen Instrument Co.
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Air
Jensen Instrument Co.
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Boiler
Jensen Instrument Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.

Meters, Burner Test
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Cast Iron Gas
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meter Connections
Lattimer-Stevens Co.
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Complaint
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.

Meters, Consumers
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Flow
Jensen Instrument Co.
Metric Metal Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Fluid
Jensen Instrument Co.
Metric Metal Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Gas
Jensen Instrument Co.
National Meter Co.
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Gasoline and Oil
Jensen Instrument Co.
Metric Metal Works.
Pittsburgh Meter Co.
Westcott & Greis, Inc.

Meters, High Pressure Distribution
Jensen Instrument Co.
Metric Metal Works.
Pittsburgh Meter Co.
Pacific Meter Works.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, High Pressure Iron Case
The E. A. Key Company
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Industrial Consumers
Jensen Instrument Co.
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
The Foxboro Co., Inc.

Meters, Iron Case
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Laboratory
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Large Capacity
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.
Westcott & Greis, Inc.

Meters, Oil
Jensen Instrument Co.
Metric Metal Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Orifice
Jensen Instrument Co.
S. Herbert Lanyon.
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Oxygen
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Oxygen and Hydrogen
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Prepayment
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.
Sprague Meter Co.

Meters, Station
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.

Meters, Steam
Jensen Instrument Co.
Metric Metal Works.
National Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Meters, Test
Metric Metal Works.
Pittsburgh Meter Co.
Pacific Meter Works.
Sprague Meter Co.
Westcott & Greis, Inc.

Photo Western Pipe & Steel Co.

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Pittsburgh Meter Co.
Westcott & Greis, Inc.

Meters, Wet Test
Metric Metal Works.
National Meter Co.
Pacific Meter Works.
Pittsburgh Meter Co.

Mixers, Gas and Air
Geo. D. Roper Corporation.
National Meter Co.
Pacific Gas Heating Co.

Motors
Smith, Booth, Usher Co.

Oil Condenser Sections
S. Herbert Lanyon.
Steere Engineering Co.

Oil, Diaphragm
Pacific Meter Works.

Oxide
The Alpha-Lux Co., Inc.

Paint
Eclipse Paint & Mfg. Co.
The Paraffine Co.s, Inc.
Everlasting Paint & Sales Co.
Hill, Hubbell & Company.

Paint—Black
Pioneer Paper Company.

Photometers
Pacific Meter Works.

Pilots
Gas Furnace Association.
Payne Furnace & Supply Co.

Pipe
Smith, Booth, Usher Co.
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.
Western Pipe & Steel Co.

Pipe Compound
E. A. Key Co.

Pipe—Copper
[redacted]r Co.

Pipe Covering
Everlasting Paint & Sales Co.
Hill, Hubbell & Company.
The Paraffine Co.s, Inc.
Pioneer Paper Company.

Pipe—Iron
South Chester Tube Company

Pipe—Steel
South Chester Tube Company

Pipe and Nipple Threading Machines
Smith, Booth, Usher Co.

Pipe Coils, Bends, Van Stone Joints, Gasketless Flange Joints, Welded Nozzle Headers
Philadelphia Steel & Iron Co.
Steere Engineering Co.

Pipe Jointers
Mueller Co.

Plants
Baker Iron Works.
Everlasting Paint & Sales Co.
Smith, Booth, Usher Co.

Plugs (testing mains and running service)
Safety Gas Main Stopper Co.
United States Cast Iron Pipe and Foundry Co.
Jensen Instrument Co.
The Foxboro Co., Inc.

Pre-Heaters
Baker Iron Works.
C. F. Braun & Co.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Producers, Gas
Steere Engineering Co.
United States Cast Iron Pipe and Foundry Co.

Protective Coating
Hill, Hubbell & Company.

Protective Coating
Everlasting Paint & Sales Co.
Hill, Hubbell & Co.

Provers, Meter
Metric Metal Works.
Pacific Meter Works.
Pittsburgh Meter Co.

Pumps
Ingersoll-Rand Co.
Mueller Co.
Oliver Continuous Filter Co.
Pacific Meter Works.
Geo. D. Roper Corporation.
Safety Gas Main Stopper Co.
Smith, Booth, Usher Co.

Purifiers
Baker Iron Works.
Steere Engineering Co.

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Connelly Iron Sponge & Governor Co.

Purifiers, Oil Absorption
Western Pipe & Steel Co.

Pyrometers (Indicating and Recording)
Jensen Instrument Co.
Westcott & Greis, Inc.

Radiants
American Refractories Co.
General Gas Light Co.

Radiant Heaters
Gas Furnace Association.
General Gas Light Co.
Pacific Gas Heating Co.
Welsbach Company.

Radiators, Gas-Fired
Gas Furnace Association.
Pacific Gas Heating Co.
Potter Radiator Corporation.

Radiators, Gas-Steam
Gas Furnace Association.
Pacific Gas Heating Co.

Ranges
Geo. D. Roper Corporation.
Tappan Stove Co.

Ranges, Closed Top
Tappan Stove Co.

Receivers, Air
Ingersoll-Rand Co.
John Wood Mfg. Co.
Montague Pipe & Steel Co.
Western Pipe & Steel Co.

Recorders
Jensen Instrument Co.
Metric Metal Works.
Smith, Booth, Usher Co.
Pittsburgh Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Refrigerating Machinery
C. & G. Cooper Co.
Ingersoll-Rand Co.

Refractory Materials
Abrasive Engineering Corp'n.
The Alpha-Lux Co., Inc.
American Refractories Co.
S. Herbert Lanyon.
Los Angeles Pressed Brick Co.
Stockton Fire Brick Co.

Regulators
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Jensen Instrument Co.
Mueller Co.
Reynolds Gas Regulator Co.
Smith, Booth, Usher Co.
Sprague Meter Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Regulators, Heat
Arthur F. Erickson Co.
Payne Furnace & Supply Co.
The Foxboro Co., Inc.
L. R. Teeple Co.

Regulators, High Pressure
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Mueller Co.
Reliance Mfg. Co.
Reynolds Gas Regulator Co.
Smith, Booth, Usher Co.
Sprague Meter Co.
L. R. Teeple Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Regulators, Hot Water Heat Control
Mueller Co.

Regulators, Low Pressure
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Connelly Iron Sponge & Governor Co.
Reliance Mfg. Co.
Mueller Co.
Reynolds Gas Regulator Co.
Smith, Booth, Usher Co.
Sprague Meter Co.
The Foxboro Co., Inc.
L. R. Teeple Co.
Westcott & Greis, Inc.

Regulators, Temperature
Arthur F. Erickson Co.
Jensen Instrument Co.
Payne Furnace & Supply Co.
The Foxboro Co., Inc.
L. R. Teeple Co.
Westcott & Greis, Inc.

Regulators, Oven
Connelly Iron Sponge & Governor Co.
The Foxboro Co., Inc.

Repairs—Brickwork
J. N. J. Firebrick Co.

Resuscitating and First Aid Devices
Connelly Iron Sponge & Governor Co.

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Abrasive Engineering Corp'n.

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Montague Pipe & Steel Co.

Riveters, Pneumatic
Ingersoll-Rand Co.

Rivet Sets
Ingersoll-Rand Co.

Roofing
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Pioneer Paper Company.

Rotisserie
General Gas Light Co.

Rust Preventatives
Everlasting Paint & Sales Co.
Pioneer Paper Company.

Safety Devices
American La France Fire Engine Co.

Seals
Lattimer-Stevens Co.

Scrubbers
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Montague Pipe & Steel Co.
Southwestern Engineering Corp.
Steere Engineering Co.
Western Pipe & Steel Co.

Selling Agents
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Settings, Boiler and Bench
S. Herbert Lanyon.
J. J. Thorpe & Son, Inc.

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Montague Pipe & Steel Co.
Western Pipe & Steel Co.

Shingles
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Specials
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Stacks, Steel
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Montague Pipe & Steel Co.
Steere Engineering Co.
Western Pipe & Steel Co.

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Baker Iron Works.
Montague Pipe & Steel Co.
Western Pipe & Steel Co.

Steel, Alloy
Philadelphia Steel & Iron Co.

Steel Plate Construction
Baker Iron Works.
Montague Pipe & Steel Co.
Philadelphia Steel & Iron Co.
Steere Engineering Co.
Western Pipe & Steel Co.

Steel Work, Structural
Baker Iron Works.
Steere Engineering Co.
Western Pipe & Steel Co.

Stills
Baker Iron Works.
C. F. Braun & Co.
S. Herbert Lanyon.
Southwestern Engineering Corp.
Western Pipe & Steel Co.

Stoppers, Gas Main
Mueller Co.
Safety Gas Main Stopper Co.

Stops, Brass
Mueller Co.

Stops, Iron Body
Mueller Co.

Stoves
Geo. D. Roper Corporation.

Strainer, Gas, Water, Air, and Oil
Mueller Co.

Systems
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Steere Engineering Co.

Surface Irrigation Pipe
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Systems—Heating
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Systems, Hot Water Heat Control
Mueller Co.

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Steere Engineering Co.

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Payne Furnace & Supply Co.
L. R. Teeple Co.

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Oliver Continuous Filter Co.

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American Refractories Co.
Los Angeles Pressed Brick Co.
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Stockton Fire Brick Co.

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Steere Engineering Co.

Tubing
Mueller Co.
Steere Engineering Co.

Tubing—Iron
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Tubing—Steel
South Chester Tube Company

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Steere Engineering Co.

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Philadelphia Steel & Iron Co.
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Smith, Booth, Usher Co.
Steere Engineering Co.

Valves, Back Pressure
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Jensen Instrument Co.
S. Herbert Lanyon.
Reynolds Gas Regulator Co.
Steere Engineering Co.
Westcott & Greis, Inc.

Valves, Electro-Magnetic
Arthur F. Erickson Co.
Gas Furnace Association.
S. Herbert Lanyon.
Potter Radiator Corporation.
L. R. Teeple Co.

Valves, Gas Engine
The C. & G. Cooper Co.

Valves, Gate
Baker Iron Works.
Philadelphia Steel & Iron Co.
Smith, Booth, Usher Co.
Steere Engineering Co.

Valves, Needle for Gas Stoves
L. R. Teeple Co.

Valves, Relief
Chaplin-Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Jensen Instrument Co.
S. Herbert Lanyon.
Mueller Co.
Reynolds Gas Regulator Co.
Smith, Booth, Usher Co.

Valves, Plug
Jensen Instrument Co.
Lattimer-Stevens Co.
Merco Nordstrom Valve Co.

Valves, Thermo
Arthur F. Erickson Co.

Varnishes
Hill, Hubbell & Company.

Vent Pipe
Gas Furnace Association.
Mueller Co.

Ventilators
Gas Furnace Association.

Vulcanizers (Tube) Gas
Reliance Mfg. Co.

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Steere Engineering Co.
Western Pipe & Steel Co.

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Beacon Water Heater Co.
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Yarn, Calking
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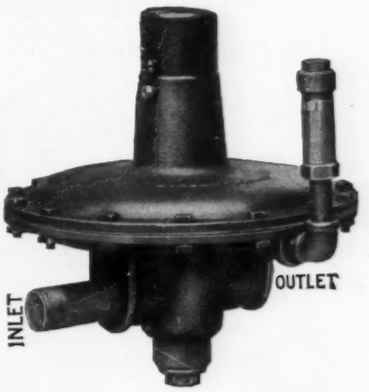

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THE FULTON Sensitive Service Governor is opened by a spring instead of lever and weight. This spring is constructed of special material and of a new design—it will not break or lose its elasticity. A simple turn to the right or left of the adjustment screw will give any desired pressure from 2 inches water to 6 ounces. The spring case can then be locked and sealed against tampering persons.

The FULTON Sensitive Service Governor (Spring Style) is particularly adapted for use on high pressure service lines connecting users directly with high pressure mains. It is extremely sensitive. Will control any intake pressure up to 100 lbs. and give any desired delivey, with practically no variation, no matter how greatly the inlet pressure may fluctuate.

The FULTON Sensitive Service Governor (Spring Style) is recommended for either Natural or Artificial Gas.

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FOR

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Westinghouse Positive Fluid Gas Meter. An all-metal meter for either HIGH or LOW Pressure, Manufactured or Natural Gas.

Specially adapted to Commercial or Industrial Services.

Ironclad Cast Iron Dry Gas Meter—for Domestic and small Industrial or Commercial Services, either Natural or Manufactured Gas.

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First prize winner, California Maid Exposition, and has approval of American Gas Range Association. Manufactured complete in the most modern stove plant in the world.

Expanses of gleaming white enamel with black edging and gray door frames—not a bolt head to be seen—rolled edges, rounded corners, no cracks or crevices—truly this whole range looks like one piece of crockery; you can tell at a glance that it cleans as easily as a saucer.

The skill of an experienced organization produced White Star. Sheet steel, cast iron and channel iron with interlocking joints combine to make this range rigid, but with enough "give," under strain, to protect the enamel—a big service-cutting feature.

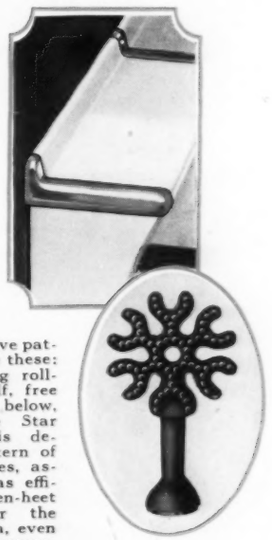
Think of the sales

these 14 points mean to you!

Fourteen important, instantly visible features that win interested attention at the customer's first glance! And only White Star has these sales-pulling betterments for they're all patented!

PRICES

White Star clinches sales easily with surprisingly low prices. You ought to have all particulars—where shall we send them?

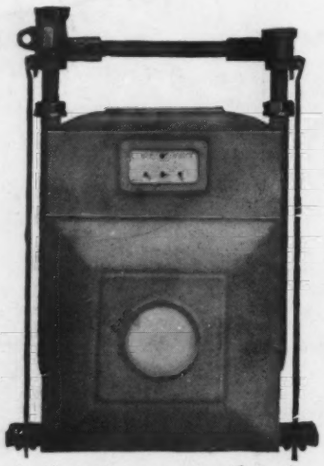


Two other exclusive patented features are these: above, the strong roll-top Heating Shelf, free of crevices, and below, the new White Star Burner. This is designed on a pattern of interlocking circles, assuring greater gas efficiency and oven-heet distribution over the entire burner area, even at lowest pressure. Which makes for cooking success.

Don't you think fourteen important improvements like these can step up your volume without expensive sales effort?

THE DETROIT VAPOR STOVE COMPANY
Detroit, Michigan

White Star
GAS RANGES



Lattimer-Stevens No. 45-A tie-in bar type meter connection with meter shelf. This connection can be furnished either with or without stop cock built into the inlet.

Meter Protection

LATTIMER-STEVENS meter connections are made for the sole purpose of protecting the delicate instrument which serves as the connecting link between gas companies and their customers. Reducing to a minimum the complaints due to leakage caused by sagging strains or washer shrinkage, Lattimer-Stevens meter connections and shelves tend to create good will between producer and consumer.

Lattimer-Stevens connections are furnished in either tie-in or overlapping bar types, with or without built-in stop cocks and in styles to meet every meter setting requirement. All connections are made so that the L-S patented shelf may be used.

Samples, catalog and prices will be sent on request.

THE LATTIMER-STEVENS COMPANY
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The Eastern Service Co.

San Francisco Representative
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122 South Michigan Ave.

LattimerStevens
METER CONNECTIONS-SHELVES
STOP COCKS AND SEALS